

*Primary & Secondary Qualities: The Historical and Ongoing Debate*, edited by Lawrence Nolan. Oxford: Oxford University Press, 2011. pp. 404

*Primary & Secondary Qualities: The Historical and Ongoing Debate* is an excellent collection of fourteen new essays that chart the development of the distinction between primary and secondary qualities from the Pre-Socratics to contemporary philosophy of mind and perception. Readers of this journal will be pleased to hear that Locke occupies a central position in the volume: two of the collection's best essays, by Michael Ayers and Edwin McCann, offer interpretations of II.viii of Locke's *Essay concerning Human Understanding*, and almost all the contributions take Locke's discussion of the primary-secondary quality distinction as a point of reference.<sup>1</sup> Coverage of other figures traditionally associated with the distinction varies somewhat: Descartes, Hume, and Reid are all well represented, although there is comparatively little discussion of writers like Hobbes, Malebranche, Berkeley, or Boyle (who appears largely in a supporting role in discussions of Descartes and Locke). The volume also considers less well widely discussed versions of the primary-secondary quality distinction in Plato, Aristotle, the Scholastic Aristotelians, Gassendi, Leibniz, Kant, and Helmholtz. Clocking in at just under 400 pages, and covering a period of over 2500 years, the volume is extraordinarily rich, demonstrating both the historical importance of the primary-secondary quality distinction and its enduring interest. The following is a selective discussion of some of the issues that are raised in the collection, focussing on those that are particularly relevant to Locke and the early modern period.

The primary-secondary quality distinction is traditionally associated with the Scientific Revolution of the early modern period. However, Lee and Pasnau argue that distinctions between ontologically basic 'primary qualities' and ontologically derivative 'secondary qualities'—although differing in extension amongst themselves, and from versions of the distinction drawn in the seventeenth century—were a mainstay of ancient Greek and Scholastic Aristotelian philosophy, perhaps going back even as far as Thales's famous claim that 'all is water' (Lee, p. 18).<sup>2</sup> Pasnau's discussion of Scholastic Aristotelian theories of qualities provides a particularly welcome introduction to the under-explored debates that form the background to the seventeenth century discussions. Following Aristotle, Scholastic philosophers identified four primary qualities that are fundamental to the explanation of natural change: hot, cold, wet, and dry. These qualities are

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<sup>1</sup> References are to John Locke, *An Essay concerning Human Understanding*, edited by Peter Nidditch (Oxford: Clarendon Press, 1975), hereafter 'Essay'. References are by Book, Chapter, Section, and where relevant, Edition.

<sup>2</sup> Unless otherwise stated, references are to *Primary & Secondary Qualities: The Historical and Ongoing Debate*, edited by Lawrence Nolan (Oxford: Oxford University Press, 2011).

universal, the qualities on which secondary qualities supervene, and the primary causal agents in the physical world (Pasnau, pp. 45-6). Interestingly, Pasnau notes that the ‘mechanical affections’ of matter—shape, size, solidity, motion—that occupy a central role in early modern discussions, enjoy a somewhat indeterminate status in Scholastic philosophy. The mechanical properties of matter are neither primary nor secondary qualities, but occupy a distinct ontological category. One striking consequence of this is that sound—a paradigmatic seventeenth century secondary quality—does not feature on the Scholastic list of secondary qualities, because it depends on motion in the air.

Pasnau attempts to dispel two common assumptions about Scholastic secondary qualities: that they are *sui generis* primitive properties, and that they exactly resemble sensory experiences of them. Against the first assumption, Pasnau suggests that Scholastic secondary qualities could not be *sui generis* primitive properties because they supervene on explanatorily basic primary qualities (p. 52). However, supervening on more basic properties is not obviously inconsistent with being primitive. G.E. Moore held that values are primitive non-natural properties, but also thought that values supervene on natural properties (indeed, Moore is sometimes credited with introducing the concept of supervenience into contemporary philosophical discussions).<sup>3</sup> Similarly, modern naïve realists (or primitivists) about colour normally insist that colours, though distinct from physical properties, supervene on them.<sup>4</sup> Moreover, it does not follow from the fact that primary qualities are explanatorily basic that secondary qualities are explanatorily idle, and do not causally explain sensory experiences. This is also a theme familiar from recent discussions of naïve realist theories of colour, where securing a causal role for colours to play in the production of colour experiences is considered to be a necessary condition for their success (cf. Maund, p. 367).

Against the assumption that Scholastic secondary qualities exactly resemble sensory experiences of them, Pasnau argues that we should not think of Scholastic secondary qualities as phenomenal features of sensory experience that are ‘veridically projected’ onto the world (p. 52). Instead, Pasnau emphasises that the ‘formal’ likeness of intentional species in the cognitive faculty to the qualities that they represent does not require *exact* resemblance. However, although there is no doubt some unclarity about the subtleties of Scholastic theories of sensible qualities amongst early modern critics (and early modern commentators), it is not clear that Scholastic ‘resemblance theses’ are normally understood in terms of ‘veridical projection’, as Pasnau suggests. The view that the early moderns are concerned to reject is one according to which sensory experiences

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<sup>3</sup> G.E. Moore, *Principia Ethica* (Cambridge: Cambridge University Press, 1903).

<sup>4</sup> See, for instance, John Campbell, ‘A Simple View of Colour’, in *Reality: Representation and Projection*, edited by John Haldane and Crispin Wright (Oxford: Oxford University Press, 1993), pp. 257-268.

resemble qualities of objects *because* those qualities *cause* our experiences, via the transmission of sensible forms from objects to the eye—the ‘little images flitting through the air’ that Descartes caricatured.<sup>5</sup> Crucially, the direction of explanation goes from world to mind, not mind to world. Hence, when Locke says that hot, light, white, sweet ‘are commonly thought to be the same in those bodies that those ideas are in us, the one the perfect resemblance of the other, as they are in a mirror’ (*Essay*, II.viii.16, cited by Pasnau as an example of ‘Veridical Projection’, p. 52, n. 10), his point is presumably that the nature of the sensible qualities is thought to determine the nature of the resembling ideas, in the way that the nature of an object determines the nature of a resembling mirror image. As such, the view that Locke is considering is more like the view that Pasnau attributes to the fourteenth century writer William Crathorn, that ‘the world’s sensible qualities are projected *into* the mind’ (p. 53, emphasis added).

Even if the distinction between primary and secondary qualities is not ‘invented out of whole cloth’ in the early modern period (Pasnau, p. 59), the distinction between mechanical qualities of matter—such as extension, shape, motion, and perhaps solidity—and sensible qualities—including colour, smell, taste, sound—is often considered to be a defining feature of the ‘new philosophy’ of the seventeenth century, and one of its enduring intellectual legacies. Six of the essays in the volume consider the development of the distinction during the seventeenth century.

Perhaps surprisingly, given the association of the new philosophy of matter with the primary-secondary quality distinction, LoLordo argues that the mechanical atomist Gassendi does not draw a clear version of the traditional distinction between primary and secondary qualities. According to LoLordo, the primary-secondary quality distinction in its traditional form—as it is found, for instance, in Locke—is a metaphysical distinction. However, LoLordo argues that Gassendi draws a distinction between primary and secondary qualities that is merely epistemic: because Gassendi identifies secondary qualities with (non-relational) textures or arrangements of atoms, and not (relational) powers to affect perceivers, the only difference between primary and secondary qualities is the epistemic difference that secondary qualities are picked out by their relation to human sensory experience.

LoLordo’s paper raises a number of questions. First, we might wonder whether the primary-secondary quality distinction is an essentially metaphysical distinction. If it is, then it might not just be Gassendi who fails to draw a version of it. According to some interpretations, Descartes (but contrast Nolan), Reid (but contrast Van Cleve), and perhaps even Locke himself (as LoLordo herself p. 72, n 27 concedes; e.g. *Essay*,

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<sup>5</sup> Rene Descartes, *Optics*, in *The Philosophical Writings of Descartes*, edited and translated by J. Cottingham, R. Stoothoff, and D. Murdoch (Cambridge: Cambridge University Press, 1984, two volumes), hereafter ‘CSM’. Quotation is from CSM 1, 153-154.

II.viii.17, II.xxi.73) also identify secondary qualities with textures or arrangements of atoms, and so might not count as drawing a distinction between primary and secondary qualities. Leibniz will not count as drawing a version of the primary-secondary distinction for slightly different reasons: against a phenomenalist background, Leibniz draws an epistemic distinction between primary qualities that may be distinctly conceived, and secondary qualities that we perceive only very confusedly as a result of the fact that sensible qualities are mechanical configurations of endlessly divided and diversified material parts (see Bolton). Similar issues arise in relation to the distinction between primary qualities and secondary qualities drawn by Kant within the realm of appearances, as from the transcendental perspective space, time, and colours are all mere appearances, or ‘bare effects on human sensibility’ (Hatfield, p. 322).

Indeed, one of the morals that the essays in this volume collectively suggest is that there should be some latitude about what is to count as a distinction between primary and secondary qualities. The contributions reveal that there are in the vicinity a bewildering array of metaphysical, epistemological, and perhaps even pragmatic distinctions (as Nelson and Landy suggest in relation to Hume), often differing greatly in extension. It is therefore perhaps better to avoid speaking of *the* primary-secondary quality distinction, and recognise instead a number of primary-secondary quality *distinctions*, standing in relations of family resemblance to each other.

But even if we accept that a distinction between primary and secondary qualities is an essentially metaphysical distinction, it is not clear that metaphysical distinction it is possible to draw is between intrinsic (non-relational) primary qualities of atoms or arrangements of atoms, and extrinsic (relational) secondary qualities consisting in powers to affect perceiving subjects. An equally promising metaphysical distinction (which LoLordo dismisses rather quickly, p. 68) is between *essential* and *inessential* properties of matter. For instance, this distinction is expressed in Descartes’s claim that the ‘the nature of body’ consists only in extension, because we cannot conceive of matter that is not extended, but we can conceive of material objects that are not (for example) coloured (*Principles of Philosophy*, II: §4; CSM 1, 224), and indeed we have ‘have often seen stones so transparent as to lack colour’ (*Principles*, II: §11; CSM 1, 227). A similar thought is expressed by Locke’s claim that the primary qualities of matter are those qualities that are ‘utterly inseparable from the Body, in what estate soever it be’: those qualities that are retained throughout all bodily interactions, are perceived in all observable pieces of matter, and attributed by thought to all insensible pieces of matter (*Essay*, II.viii.9, eds. 4-5; cf. II.iv.1 on solidity). Whereas primary qualities are inseparable from matter and so essential to it, secondary qualities, in contrast, are not inseparable from matter, and therefore inessential to it: the red and white colours of porphyry ‘Vanish’ in the dark (*Essay*, II.viii.19); sand, pounded glass, hair, and blood are all more or less ‘pellucid’ or colourless when seen under a microscope (*Essay*, II.xxiii.11); and, in general, secondary

qualities ‘vanish and cease, and are reduced to their Causes’ when unperceived (*Essay*, II.viii.17).

Descartes’s views of primary and secondary qualities are considered in more detail by Nolan and Downing. In his provocative contribution, Nolan argues against standard realist interpretations of Descartes’s view of secondary qualities, on which secondary qualities are either physical or dispositional qualities of material substances, or else sensations relegated to the ‘ontological dustbin of the mind’ (in effect, *qualia*). Emphasising Descartes’s frequent use of the phrase ‘what we call “colour”’, Nolan argues instead that Descartes is a ‘colour nominalist’, whose ‘positive claims are restricted to how we use color *terms* and do not purport to assert any metaphysical theses about the status of secondary qualities’ (p. 82). This intriguing proposal raises a number of questions. First, if nominalism is a form of anti-realism, then it seems slightly misleading to say that Descartes does not purport to assert any metaphysical theses about the status of the secondary qualities, rather than asserting the decidedly metaphysical thesis that there *are* no colours, just colour names. Second, this interpretation raises wider questions about Cartesian views of sensation and ideas: for instance, Nolan’s interpretation rests on the controversial claim that Cartesian sensations ‘do not represent anything non-extensive in bodies’ (p. 96), and do not merely misrepresent (or perhaps under-represent) corpuscular textures. Finally, Nolan’s argument against identifying secondary qualities with corpuscular textures depends on sharply distinguishing claims about the external causes of visual perception from metaphysical assertions about the nature of colour (pp. 85-92). But it is not clear that Descartes himself draws such a sharp distinction, rather than identifying colours with the external causes of visual perception.

Downing, meanwhile, considers Descartes’s reasons for denying the existence of ‘real corporeal sensible qualities’: irreducible qualities of objects that resemble our experience of them (p. 110). Suggesting that Descartes’s arguments for ‘stripping bodies of their sensible qualities’ often appeal to nothing more than Occam’s Razor, Downing claims that an argument for the stronger conclusion that real corporeal sensible qualities are strictly *unintelligible*—and not merely theoretically unnecessary—can be found in *The Principles of Philosophy*, I: §§66-71. Based on detailed analysis of these sections (pp. 118-128), Downing argues that Descartes has no question-begging grounds for the unintelligibility claim. But by comparing Descartes’s position with Boyle’s, she concludes by suggesting that Descartes at least succeeds (in *Principles*, IV: §198) in ‘issuing an explanatory challenge’ to defenders of real corporeal sensible qualities: to say how these qualities might explain sensory experiences, given that it is ‘quite unobvious what such an explanation would look like’ (p. 133).

The argumentative structure of Downing’s paper is somewhat difficult to follow, but her discussion looks to misrepresent Descartes’s argument in two crucial ways. First, Descartes does not think that it is merely ‘unobvious’ what an explanation of sensory experiences in terms of real corporeal sensible qualities would look like. Rather, such a

putative explanation would be strictly ‘unintelligible’, because it would presuppose the existence of real qualities that interact with the size, shape, and motion of material substances. This is supposedly unintelligible because there would have to be a lack of “likeness” or “proportion” between the putative causes and effects (on the “likeness” of causes to effects, see e.g. Third Meditation, CSM II, 28). As Descartes puts it:

there is no way of understanding how these same attributes (size, shape and motion) can produce *something else whose nature is quite different from their own*—like the substantial forms and real qualities which many philosophers suppose to inhere in things; and we cannot understand how these qualities or forms have the power subsequently to produce local motions in other bodies...all this [is] unintelligible (*Principles*, IV: §198, emphasis added).

This unintelligibility claim in turn follows on from the earlier discussion in the *Principles*, where Descartes aims to establish that the essential nature of matter consists solely in extension. Rather than ‘simply presupposing essentialism’ as Downing suggests (p. 127), Descartes *argues* for the claim that secondary qualities are not essential properties of matter by suggesting that we can conceive of, and have perceived, objects that lack secondary qualities (*Principles*, II: §§4, 11, and see the discussion of LoLordo above—although as Downing notes, these claims are not uncontroversial; for instance, see Berkeley’s comment: ‘Ask a Cartesian whether he is wont to imagine his globules without colour, pellucidness is a colour’.<sup>6</sup>) To say that sensible qualities are non-essential (accidental) qualities of matter is not to say that they are *not* qualities of matter. Still, if they are non-essential, sensible qualities must at least be reducible to size, shape, and motion. Otherwise size, shape, and motion would have to be able to produce real corporeal sensible qualities; but given the requirement that causes resemble effects, they cannot.

The relationship of Locke’s distinction between primary and secondary qualities to those of strict mechanists like Descartes’s is an issue taken up by Ayers and McCann. Both aim to disentangle Locke’s reasons for accepting the primary-secondary quality distinction from those provided by the corpuscularian theory of matter, given that Locke famously expressed reservations about the explanatory adequacy of corpuscularianism, and as Ayers notes, these reservations apparently predate his enthusiasm for mechanism (p. 144).

Ayers’s essay focuses initially on two tensions in Locke’s writings. The first tension is between corpuscularian interpretations of Locke’s arguments for the primary-secondary quality distinction, and interpretations that appeal to the common sense observation that secondary qualities are essentially ways that their possessors appear to

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<sup>6</sup> George Berkeley, *Philosophical Notebooks*, in *Philosophical Works*, edited by Michael Ayers (London: Everyman, 1975), §453.

one sense. The second tension is between Locke's view of the corpuscularian hypothesis as the most intelligible explanation of natural phenomena, and his scepticism about the adequacy of corpuscularianism for producing an account of the real essences of material substances. (Ayers also considers a third tension relating to Locke's claim that only ideas of primary qualities 'resemble' qualities of objects, between Locke's tendency to think of ideas 'objectively' in terms of what they are ideas of, and his tendency to treat ideas as 'blank sensory effects' which are not essentially representational; I will not consider this further tension here.)

Ayers argues for a subtle resolution of these tensions. On Ayers's interpretation, Locke's argument is largely independent of the truth of the corpuscularian thesis, and depends in part on the observation that secondary qualities, unlike primary qualities, are essentially the way things appear to one sense, modulo certain qualifications about solidity and heat (pp. 139-142). Despite its similarity to arguments presented by 'dogmatic mechanists' like Descartes, Ayers argues that II.viii.9-15 of the *Essay* is intended to show only that the corpuscularian hypothesis is 'partially intelligible' (p. 149). According to Ayers, Locke starts by drawing up a list of primary qualities that are 'inseparable' from matter, and hence make bodies what they are, independently of the corpuscularian theory: primary qualities are those that we constantly perceive in matter, and which we cannot conceive of matter not possessing (*Essay*, II.viii.9, eds. 4-5). Given that we can only intelligibly understand bodies acting mechanistically by impulse (*Essay*, II.viii.11), Ayers suggests that it is 'compelling' to speculate that the primary qualities of insensible particles cause our sensations, including both our ideas of primary qualities (*Essay*, II.viii.12) and our ideas of secondary qualities (*Essay*, II.viii.13). But as secondary qualities are in any case 'evidently bound up with particular modes of perceiving things that may be peculiar to particular classes of animals' (Ayers, p. 150), the conclusion that colours are powers to affect the senses need not rely solely on the corpuscularian hypothesis. According to Ayers, the fact that secondary qualities are definable by their relationship to the sense by which they are perceived comes out in the discussion of II.viii.16-21, for instance when Locke remarks that: 'Take away the Sensation of them....and all Colours, Tastes, Odors, and Sounds, as they are such particular *Ideas*, vanish and cease, and are reduced to their Causes, i.e. Bulk, Figure, and Motion of Parts' (*Essay*, II.viii.17).

Whether this dissociation of common sense and corpuscularian considerations can be effected, however, is debatable. First, the appeal to II.viii.16-21 in support of this interpretation is problematic. As Ayers notes, these sections include a number of 'speculative mechanistic explanations' (p. 149), and this suggests that the considerations adduced here are not independent of the corpuscularian theory; for instance, II.viii.17 itself leads into a comparison between secondary qualities, which we mistakenly assume to be 'really in' an object like manna, and sensations of sickness and pain, which are 'nothing, but the effects of its operations on the Stomach and Guts, by the size, motion,

and figure of its insensible parts; (for by nothing else can a Body operate, as has been proved)' (*Essay*, II.viii.18). Besides, according to the marginal summary of II.viii.15-22 ('Ideas of *primary Qualities are resemblances; of secondary not*'), these sections serve to elucidate the resemblance claim of II.viii.15, which is itself a conclusion drawn on the basis of the argument of II.viii.9-14 ('From whence I think it is easie to draw this Observation...', *Essay*, II.viii.15); indeed, §§16-21 are entirely absent from the *Abstract* of the *Essay* published in 1688, the text of which corresponds to II.viii.9-15 of the first edition. This suggests that Locke's argument for the primary-secondary quality distinction must be located primarily in the earlier sections.

But as Ayers also notes, the argument of II.viii.9-15 is very similar to arguments used by strict mechanists like Descartes. It is therefore difficult to see how Locke's version of the argument is supposed to differ from theirs; in particular, it is difficult to see how the identification of the primary qualities of bodies—which according to Ayers is merely a piece of reflective common sense—can be divorced from mechanistic theories of body, bodily interaction, and perception. The structure of Locke's argument in these sections is clearest in the first three editions of the *Essay* (Locke made a number of important changes to II.viii.9-15 in the fourth edition, the edition on which Nidditch's text is based). Locke starts by identifying the primary qualities of matter: solidity, extension, figure, motion, and number (*Essay*, II.viii.9, eds. 1-3). The primary qualities are those qualities that we perceive in every piece of matter, and without which matter cannot be conceived (*Essay*, II.viii.10, eds. 1-3); this way of identifying the primary, or essential, qualities of matter—primary qualities are those which we constantly perceive, and which we cannot conceive matter to lack—is the standard procedure for identifying the essential qualities of matter employed by mechanists like Descartes (see the discussions of LoLordo and Downing above). The section identifying the nature of matter is then immediately followed by the 'impulse principle'—the description of secondary and tertiary qualities in II.viii.10 was only added in the fourth edition. The 'impulse principle' was itself changed in the fourth edition, in light of Newton's *Principia*, but in the first edition reads:

The next thing to be consider'd, is how *Bodies operate* one upon another, and that is manifestly *by impulse*, and nothing else. It being impossible to conceive, that Body should operate on what it does not touch, (which is all one as to imagine it can operate where it is not) or when it does touch, operate any other way than by Motion (*Essay*, II.viii.11, ed. 1; there are minor changes to eds. 2-3).

The claim about how bodies operate is presumably supposed to follow *a priori* from the immediately prior claim about the nature of body: given that bodies are essentially solid, extended, and mobile, their interactions have to be understood exclusively in terms of these qualities, as involving nothing more than the communication of motion between



solid bodies on contact. It follows that the only possible intelligible theory of visual perception will explain visual perception in terms of the communication of motion from objects to the sense organs via insensible particles (*Essay*, II.viii.12-13). As such, secondary qualities must be powers to produce sensations that depend on the primary qualities of the parts of objects (*Essay*, II.viii.14), and hence only ideas of primary qualities resemble qualities of objects (*Essay*, II.viii.15).

Of course, if Locke's argument for a distinction between primary and secondary qualities distinction is indistinguishable from arguments offered by strict mechanists like Descartes, then Locke's sceptical attitude towards the intelligibility of corpuscular explanations still needs to be explained. One possibility is that this is simply one of the tensions for which Locke's *Essay* is (in)famous. More charitably, we might consider the role that the 'little excursion into Natural Philosophy' (which takes up just part of one chapter of the *Essay*) is intended to play in the structure of the *Essay* as a whole. In part, this is just 'to make the *difference between the Qualities in Bodies, and the Ideas produced by them in the Mind*, to be distinctly conceived' (*Essay*, II.viii.22). Whether or not Locke accepts, or is entitled to accept, the corpuscular theory in which this distinction has its home, the digression at least serves to illustrate the distinction between qualities in objects and ideas in the mind—and perhaps this is all that Locke requires it to do.

Similar problems arise for McCann's interpretation of II.viii. McCann agrees with Ayers that Locke's argument for the primary-secondary quality distinction is independent of the corpuscularian theory advanced by Gassendi, Charleton, and Boyle, and is therefore consistent with Locke's scepticism about mechanism. Based on consideration of the text of the first three editions of the *Essay*, McCann argues that Locke's 'argument'—or as he thinks it more appropriate to call it, 'a description of a line of thought we find it natural to engage in' (p. 169)—has three stages. At the first stage, Locke identifies our common sense conception of body, as solid extended substance (*Essay*, II.viii.9-10). The second stage of the argument starts from 'our commonsense conception of the causality of body' (p. 173), according to which the only way that we can conceive of bodies as acting is by impulse (*Essay*, II.viii.11). This grounds, not so much a *theory* of perception, as an 'amalgam of our vague notions about the causation of body...with a fanciful just-so story about how bodies at a distance act causally to produce, ultimately, sensory ideas in us' (p. 173). The third stage of the argument then concerns the notorious resemblance claim of II.viii.15, which as McCann observes, the remaining sections—the famous discussions of the manna, porphyry, water, and so on—serve to elucidate (see the marginal summary for II.viii.15-22). According to McCann, Locke employs an unmysterious notion of resemblance: the 'primary primary qualities'—the primary qualities of insensible microscopic particles—that are basic to explanation, are of the same kind as 'secondary primary qualities'—the primary qualities of the macroscopic bodies we perceive (p. 176).

But like Ayers's interpretation, McCann's interpretation overlooks the apparent logical structure of Locke's argument, and the similar arguments of strict mechanists like Descartes. II.viii.9-13 are not a loose collection of common sense views about bodies and bodily interaction; they are theoretical claims whose grounding in common sense is debatable. First, we might wonder whether our common sense conception of body excludes secondary qualities like colour, as Berkeley and Hume would later argue. Second, we might wonder whether our common sense conception of bodily interaction is restricted to action by impulse. It might be true that we can understand the bumpings and bangings of billiard balls, and that round things 'normally and understandably roll as square things do not' (as Ayers, p. 140 observes). But billiard balls are not obviously unique in this respect. From the common sense perspective, and absent a prior commitment to the claim that the only intelligible bodily interactions are mechanistic, there need be nothing particularly unintelligible about the fact that balls thrown into the air fall towards the ground, or that lemons look yellow, roses smell sweet, and manna makes us feel sick; non-impulsive causal interactions only become to seem problematic against the background of theoretical assumptions about the nature of matter and the nature of causal interaction. Of course, we might expect that it will be possible to provide some further explanation of why things fall to the ground, or why lemons look yellow. But then the same is presumably true of billiard balls' bumpings and bangings, as even mechanists, who appeal to the primary qualities of insensible particles to explain this, would agree. Indeed, Locke must himself think that he is doing something more than simply describing our common sense thought about bodies and bodily interactions. After all, he presents the conclusion of II.viii as a corrective to the 'general' belief that secondary qualities, though in fact nothing more than powers to produce sensations, 'are looked upon as real Qualities, in the things thus affecting us' (*Essay*, II.viii.24). This is not to say that the corpuscularian hypothesis is 'presupposed as an argumentative premiss for drawing the primary-secondary quality distinction (McCann, p. 179). Rather, Locke is providing an *a priori* argument for the distinction, and thereby an argument for corpuscularianism.<sup>7</sup>

The remaining essays in the volume trace the development of thinking about primary and secondary qualities after Locke. There are particularly fine essays on Leibniz's integration of the distinction into a phenomenalist framework by Bolton, and Hume's complicated attitude towards the 'fundamental principle' of modern philosophy by Winkler, who argues with some regret that 'it is impossible to construct a philosophy of the sensible qualities that [Hume] can find altogether satisfying' (p. 271). Nelson and Landy also discuss Hume, arguing primarily—in a paper that does not feel entirely at

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<sup>7</sup> I discuss these issues further in Keith Allen, 'Mechanism, Resemblance and Secondary Qualities: from Descartes to Locke', *British Journal for the History of Philosophy* 16, 2008, 273-91.

home in this collection—that Hume’s simple ideas are theoretical posits, before very briefly suggesting (by analogy with the distinction between simple and complex ideas) an interpretation of the primary-secondary quality distinction as a merely pragmatic distinction.

In the period after Hume, Hatfield considers Kant’s version of the primary-secondary quality distinction, and the development of the distinction in the Kantian framework by Helmholtz. Meanwhile, Van Cleve argues against attributing to Reid the view that secondary qualities are the causal grounds of powers to produce sensations, suggesting instead that for Reid secondary qualities are second-order dispositional properties: properties of having some property that causes certain kinds of sensations. Van Cleve argues that when Reid says that secondary qualities are the ‘unknown causes or occasions of the sensations to which we give the same names’<sup>8</sup> he cannot mean to say that (for example) colours are the unknown causal grounds of dispositions to appear coloured, because Reid wants to allow that we can know that things are coloured, and yet ‘If we do not know *what* green is, then we do not of anything *that* it is green’ (Van Cleve, p. 281). However, this is a very strong epistemological principle (reminiscent of Gareth Evans’s version of Russell’s Principle), and it is not clear that Reid himself would accept it; although Reid allows we can have a relative conception of something, it is not clear that he takes this to imply that what we have a conception *of* is itself relative. Besides, attributing Reid a conception of secondary qualities as second-order dispositional properties feels somewhat anachronistic; my suspicion is that the view of dispositional properties as second-order properties only came clearly into view as a result of discussions of functionalism in contemporary philosophy of mind, and as far as I am aware Reid does not pay any attention to the issues about multiple realizability that were important in that debate.

Van Cleve’s paper contributes to the volume’s remit of investigating the ‘ongoing debate’ about secondary qualities, by relating Reid’s account of secondary qualities to more recent philosophical work—including naïve realist (or primitivist) theories of colour, Langton’s Kant, and the physicalism of Smart, Armstrong and Harman (see pp. 288-301). Two final papers go further in this direction. Byrne and Hilbert offer a critical assessment of broadly Lockean dispositional theories of colour, focussing on problems characterising the mental effects that dispositions are dispositions to produce, whilst Maund also argues against dispositionalism, and other forms of realism, in favour of eliminativism about secondary qualities.

The volume as a whole is remarkably cohesive, and the work it contains is of a consistently high standard. This collection represents an significant contribution to our

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<sup>8</sup> Thomas Reid, *An Inquiry into the Human Mind on the Principles of Common Sense*, edited by Derek R. Brookes (Edinburgh: Edinburgh University Press, 1997), 5.1, 54.

understanding of the development of ideas about primary and secondary qualities since antiquity, and demonstrates the abiding importance of the subject to historians of philosophy and contemporary philosophers alike.