

MECHANISM, RESEMBLANCE AND SECONDARY QUALITIES

Keith Allen, University of York
ka519@york.ac.uk

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The Democritick and Epicurean Atheists...acknowledge no other Modes of Matter or Body, but only more or less Magnitude of Parts, Figure, Site, Motion, or Rest. And upon this very account do they explode Qualities, considered as Entities really distinct from these Modes; because, in the Generation and Alteration of them, there would be Real Entities made Out of Nothing, or without a Cause; whereupon they Resolve these Qualities into Mechanism and Fancy.

Cudworth 1678: 755.

It is well known that Descartes viewed the deliverances of colour experience with suspicion. Less widely discussed is the bearing of this on Locke's famous distinction between *primary qualities*, like shape, size and texture, and *secondary qualities*, like colour, taste and sound. To the near exclusion of all other seventeenth century mechanists, it is Boyle who dominates discussions of the background to Locke's distinction. This is rather surprising. In the first place, Boyle's "corpuscularian theory of matter" is supposed to be neutral on the points of doctrine that differentiate broadly mechanistic theories of matter: being "a person of a reconciling disposition", Boyle prefers to regard theories which explicate natural phenomena mechanistically by way of minute bodies, or corpuscles, as "one philosophy".¹ Acknowledging Boyle's influence on Locke is therefore consistent with recognising the influence on Locke of corpuscularians other than Boyle. The influence of one corpuscularian in particular—Descartes—is particularly well-documented. During his time as an undergraduate at Oxford, for instance, Locke made detailed notes on the most complete statement of Descartes's mechanistic science, *The Principles of Philosophy*.² The experience was obviously beneficial, as in response to Edward Clarke's request that Locke suggest reading for his son, Locke recommended Descartes's scientific theory as "perhaps the most intelligible and most consistent with it self of any yet met with".³

This paper considers Locke's famous primary-secondary quality distinction against its Cartesian background. §1 reconstructs Descartes's argument for the distinction between mechanical modifications and sensible qualities. §2 sets out Locke's very similar argument for the very similar distinction between primary and secondary qualities. The

¹ 1661: 356.

² For details, see Milton 1994.

³ de Beer 1976 ii: no. 844. The letter, sent 5/15th March 1686, dates from around the period that Locke is thought to have completed the final extant draft of the *Essay Concerning Human Understanding—Draft C*—suggesting that Descartes was fresh in Locke's mind at the time. Locke repeated his recommendation in print, in a slightly revised form, subsequent to the publication of the *Essay in Some Thoughts Concerning Education* (1693b: §193).

comparison is used in §3 to offer an interpretation of the claim that only our ideas of primary qualities “resemble” qualities of material bodies. And §4 assesses the relative strengths and weakness of the two versions of the argument. I argue that the Cartesian bifurcation of the mental into distinct sensory and intellectual faculties gives Descartes the resources to guarantee the validity of the argument for the primary-secondary quality distinction, but makes accounting for the phenomenology of sensory perception notoriously difficult. In rejecting this bifurcation, Locke’s version of the Cartesian argument is therefore deductively invalid, and yet able to respect the phenomenology of secondary quality perception in a way that Descartes’s cannot.

I. MECHANISM: DESCARTES

Descartes’s argument for the distinction between mechanical modifications like size, shape and motion, and sensible accidents like colour, taste and sound, is an essentially *a priori* argument. Fundamental to this argument is our conception of material substance, and the constraints on conceivable bodily interaction that our conception of material substance sets.

According to Descartes, the “principle property” of material substance, without which material substance is simply unintelligible, is extension.⁴ A substance’s principle property differs from its modifications in that we can clearly conceive *in general* of the substance in which a mode inheres independently of that modification. Nevertheless, at least in the case of *particular* material substances, the distinction between modification and principle attribute collapses, as we could neither sensorily perceive, nor conceive of sensorily perceiving, a particular material body that lacked the various modifications of which extended substances are capable: determinate extensions, shapes and positions and motions of their parts.⁵

Modes contrast in this respect with a substance’s accidental qualities, which can be “removed” from corporeal matter “while the matter itself remains intact”.⁶ Descartes gives two criteria by which to determine whether or not a quality is accidental. According to the *empirical criterion*, it is sufficient for a quality to be accidental that we have actually

⁴ 1644: I.53.

⁵ 1644: I.64-5. Indeed, elsewhere *modal* distinctions, between modes and substances and different modes of the same substance, and *conceptual* distinctions, between a substance and its principle property, are simply treated as species of the same distinction (1641, *First Replies*: 85-6 and Descartes to *** 1645/6, CSMK: 280).

⁶ 1644: II.4.

perceived a body that lacks it. Sensible qualities like colour are therefore accidental properties because we have actually seen stones “so transparent as to lack colour”. According to the more stringent *conceptual criterion*, a quality is accidental if we can merely conceive of a body lacking it. Hardness is therefore accidental because we can at least conceive of a melted or pulverised stone that lacks hardness.⁷ Similarly accidental by this criterion, according to Descartes, is impenetrability. As Descartes explains in a letter to More, impenetrability “involve[s] a reference to parts and presuppose[s] a continuous body of division or limitation”; we can therefore conceive of an indefinite continuous body in which there is nothing except extension.⁸

This combination of empirical and conceptual considerations determines which modifications constitute our conception of particular material substance. In turn, our conception of particular material substance determines our conception of intelligible bodily interaction. Specifically, from the fact that we conceive of material substances as extended, shaped bodies whose parts have position and motion, it follows that the only way in which we can conceive of material substances acting upon each other is by affecting the extension, shape, position and motion of the parts of the material substances with which they come into contact.

This inference from our conception of bodily substance to our conception of bodily interaction is underwritten by a *causal likeness principle*, which imposes a ‘proportionality’ constraint on the intelligibility of the causal relation: in general that nothing comes from nothing, but more specifically, that what is more perfect is not produced by what is less perfect.⁹ This principle renders unintelligible Scholastic explanations of everything from transubstantiation to secondary quality perception in terms of “real” qualities: qualities which, in contrast to inseparable modifications such as shape, are supposedly capable of being separated from, and existing independently of, material substances. Notwithstanding the conceptual confusion involved in predicating of qualities the exclusively substantial attribute of capacity for independent existence, to suppose that the inseparable mechanical modifications of bodies could ever produce a quality that is separable from material substance would be to suppose that something incapable of independent existence could have a causal influence on that which is capable of independent existence; or in other words, it would be to suppose that what is less

⁷ 1644: II.11. More prosaically, although less convincingly, we can conceive that, “[i]f, whenever our hands moved in a different direction, all the bodies in that area were to move away at the same speed as that of our approaching hands, we should never have any sensation of hardness” (1644: II.4).

⁸ Descartes to More 5th February 1649, CSMK: 361.

⁹ 1644: I.18.

perfect could have a causal influence on what is more perfect. Because this violates what Descartes regards as the intuitively certain causal likeness principle, it follows that the Scholastics, who treated change in a body's supposedly real qualities as a kind of motion, succeeded only in "making the nature of motion less intelligible to themselves". Given our conception of what material substances are, and the intuitively certain causal likeness principle, the only way we can intelligibly conceive of material substances acting upon each other is by virtue of "local motion".¹⁰

Somewhat ironically, it is far from clear exactly what Descartes intended to replace the supposedly unintelligible general Scholastic conception of motion with. Descartes's official view is that motion and rest are modifications of material substance, and so cannot pass from one body to another: to suppose otherwise would seem to require that rest and motion are precisely the kind of separable quality whose existence Descartes is at pains to deny. Nevertheless, there is a clear tension between Descartes's essentially static official conception of motion and the view of motion that is apparently presupposed by his third law of nature; governing bodily interaction, a very natural interpretation of this law is that stronger bodies literally "lose" a quantity of motion equal to that which they "impart" to weaker bodies on collision.¹¹ But whatever the correct interpretation of Descartes's conception of motion, it is incumbent on Descartes to explain our sensory perception of material substances in a way consistent with the claim that our only intelligible conception of bodily interaction is "impulsive". Central to Descartes's explanation of sense-perception in the *Principles*—which draws heavily on his earlier account of sense-perception in the *Dioptrics*—is a corpuscular theory of light in which light is described by analogy with imperceptible tennis balls reflected and refracted by objects on collision.¹² Taking this analogy at face value, sensory perception occurs when

¹⁰ 1644: I.69. Descartes tells us that "the principal argument which induced philosophers to posit real accidents was that they thought that sense-perception could not be explained without them" (1641, *Sixth Replies*: 293). Especially important, though by no means the sole motivation, is the explanation of the sensory perception of the bread and wine that according to Catholic doctrine is literally transformed into the body and blood of Christ during the Eucharist (1641, *Sixth Objections*: 281). Elsewhere, Descartes suggests that Scholastic philosophers also use real qualities to explain bodily motion (Descartes to Mersenne, 26th April 1643, CSMK: 216). For helpful discussions of real qualities, see Anstey 2000: 94-9 and Rozemond 1998: 102-38.

¹¹ 1644: II.40. This criticism is made by Henry More (see Descartes to More, August 1649, CSMK: 382). Looking ahead, it is worth noting More's influence on Locke. Locke's library contained at least 6 of More's own works (Harrison and Laslett 1965: 2043-2047a), and Locke was well acquainted with More's criticisms of Cartesian philosophy. With specific reference to More's *Enchiridion Metaphysicum* of 1671, for example, Locke wrote in his journal for 22nd January 1687, that More "wrote subtly and knowledgeably against Descartes's system" (for details, see Bonno 1955: 164).

¹² 1637: II, CSM i 156-64. In his unpublished work Descartes is less circumspect, avoiding the atomistic connotations of this analogy. In the posthumously published *The World or Treatise on Light*, for instance, Descartes instead characterises light as the instantaneous communication of a tendency to motion by

imperceptible spherical bodies travel between material bodies and the eye, pass through the fluids and transparent membranes of the eye, thereby strike the retina, and form an image. These images subsequently set into motion optic-nerve fibres, different motions of which cause different sensations in the soul.¹³ The result is an idea in the mind that represents, by “resemblance”, the particular mechanical modifications of material objects:

as a result of sensory stimulation, we have a clear and distinct perception of, some kind of matter, which is extended in length, breadth, depth, and has various differently shaped and variously moving parts...and we appear to see clearly that the idea of it comes to us from things located outside ourselves, which it *wholly resembles*.¹⁴

The claim that our ideas of the mechanical modifications of material substance “resemble” those modes serves to draw a *conceptual distinction* between a body’s mechanical modifications and its supposedly sensible qualities. Descartes illustrates this contrast by analogy with the experience of pain. We do not standardly assume that pain is a quality of the objects which cause painful sensations that in any way resembles those sensations: the sensation of pain that ensues from being struck by a sword, for example, “is completely different from the local motion of the sword or of the body that is cut”.¹⁵ According to Descartes, the situation is no different with respect to sensible qualities like colour, sound, smell and taste. Setting aside preconceived opinions formed in early childhood that are a result of the necessarily close tie between mind and body, Descartes argues that we can no more “find any intelligible resemblance” between qualities of objects and sensations of colour than we can between qualities of objects and sensations of pain.¹⁶

Suppose, for the purposes of *reductio*, that our sensations did resemble modifications of material substance. We would then first have to explain the production of these sensible qualities purely in terms of the action of an object’s mechanical modifications: we would have to explain, that is, how an object’s sensible qualities could be consequent upon its instantiating purely mechanical modifications. We would also

pressure exerted on globules of the second element by celestial matter. It is perhaps worth noting in this respect that in a letter to Vatier, Descartes claims that *The World* contains “the whole body” of his physical theory (22nd February, 1638, CSMK: 87).

¹³ 1644: IV.189-95; 1637: IV. As Descartes explains elsewhere, the motion in the optic nerve fibres causes sensations by way of images traced in the spirits on the surface of the pineal gland. See, for example, the *Treatise on Man*, posthumously published in 1664, CSM i: 106.

¹⁴ 1644: II.1, emphasis added. In a slightly earlier passage, Descartes expresses the same thought by saying that the mechanical modifications shape, size, position and motion of parts are “actually or at least possibly present in objects in a way *exactly corresponding* to our sensory perception or understanding” (1644: I.70, emphasis added).

¹⁵ 1644: IV.197.

¹⁶ 1644: I.66-71.

have to explain how these sensible qualities could in turn cause alterations in the purely mechanical modifications of other bodies, given that the proximate causes of our secondary quality sensations are motions in the brain: something attested to, Descartes claims, by sensory experiences in which sparks of flashing light are experienced as a result of striking the retina, and thereby communicating motion along the optic-nerve fibres to the brain. According to Descartes, however, neither would-be explanation is intelligible:

there is no way of understanding how...size, shape and motion can produce something else [*sc.* real qualities or Scholastic forms] whose nature is quite different from their own...and we cannot understand how these qualities or forms could have the power subsequently to produce local motions in other bodies.¹⁷

That is, we cannot understand secondary quality perception except in mechanistic terms. To suppose, for example, that colour perception is the result of real qualities literally separating themselves from material substances, ‘flitting’ through the air to the eye, and then being transmitted from eye to the mind, would violate the causal likeness principle, which requires that causes be proportional to their effects. In light of this, Descartes concludes that there is therefore a *metaphysical distinction* between mechanical modifications and sensible accidents. In contrast to shape, size and motion, sensible qualities like colour are not really qualities at all: they are “nothing else in the objects...but certain dispositions depending on size, shape and motion”.¹⁸

II. MECHANISM: LOCKE

Recognising the similarity of Descartes’s argument for the distinction between mechanical modifications and sensible accidents to Locke’s argument for the distinction between primary and secondary qualities requires first locating Locke’s argument for this distinction. This is not so straightforward as it might sound.

Locke’s argument for this distinction is commonly located primarily between II.viii.16-21, with the well-known discussions of the fire, manna, porphyry, almond and water; in her comprehensive review of the secondary literature on this subject, for instance, Margaret Wilson describes sections II.viii.19-21 in particular as constituting “a sort of watershed in historical interpretation”.¹⁹ Reflection on the structure of Locke’s

¹⁷ 1644: IV.198.

¹⁸ 1644: IV.199.

¹⁹ 1992: 212.

discussion, however, suggests that this common assumption cannot be correct. According to the marginal summaries added to the Second Edition of the *Essay* in 1694, II.viii.15-23 (II.viii.15-22 in the Fourth Edition of 1700) form a unified whole. The most natural interpretation of this is that sections 16-21—the sections in which Locke’s arguments for the primary-secondary quality distinction are usually thought to lie—serve to elucidate the claim made at II.viii.15: that only our ideas of primary qualities are resemblances. Locke describes the resemblance claim of section 15, however, as an observation that is “easie to draw” from II.viii.14, itself a statement of the primary-secondary quality distinction, drawn on the basis of the discussion of II.viii.9-13. The resemblance claim of section 15, which sections 16-21 serve to elucidate, is therefore most naturally understood as a corollary of the discussion of sections 9-14; in which case, sections 16-21 must serve merely to elucidate and clarify the conclusion that has *already* been established by II.viii.15.

This appearance is borne out if we compare the discussion of the primary-secondary quality distinction in the *Essay* with the earlier discussions in the ‘Epitome’, published two years before the *Essay* in 1688, and *Draft C* of the *Essay*, thought to be written approximately a further two years before that. Neither discussion contains anything that corresponds to the sections in which Locke’s argument for the primary-secondary quality distinction is traditionally thought to lie. Rather, the discussion in both follows very closely the text of II.viii.9-15 of the First Edition of the *Essay*.²⁰

Matters are complicated at this point by revisions that Locke made to sections 9-15 in the Fourth Edition (published in 1700), the text on which modern editions of the *Essay* are based. However, if we follow the text of the first three Editions of the *Essay*, in which the definition of secondary qualities at II.viii.10 is absent and the interaction principle of II.viii.11 is stated in its original form, it soon becomes apparent that Locke’s argument for the primary-secondary quality distinction is actually just an extremely succinct expression of Descartes’s *a priori* argument for the distinction between mechanical modifications and sensible qualities; indeed in this respect, the primary-secondary quality distinction would seem to be precisely the kind of “speculative Truth” whose discovery Locke cites in the First Edition of the *Essay* as a paradigmatically pleasurable experience.²¹

Schematically, the argument of II.viii.9-15 in the first three Editions of the *Essay* runs as follows:

²⁰ For more details, see Hill Forthcoming and Walmsley 2003.

²¹ E II.xx.18. This example does not occur in any subsequent edition.

9. The primary qualities of bodies are solidity, extension, motion or rest, number and figure.
10. Such qualities are:
- [1] “wholly inseparable from the Body”;
 - [2] “such as in all the alterations and changes it suffers...it constantly keeps”;
 - [3] “such as Sense constantly finds in every particle of Matter , which has bulk enough to be perceived”;
 - [4] inseparable in thought “from every particle of matter, though less than to make it self singly be perceived by our Senses”.
11. The only way in which we can conceive of bodies operating on each other is by *impulse*. it is “impossible to conceive, that Body should operate on what it does not touch...or when it does not touch, operate any other way than by Motion”.
12. Since the objects of perception can only operate on contact and are not “united” to our minds, “’tis evident some singly imperceptible Bodies must come from them to the Eyes, and thereby convey to the Brain some *Motion*, which produces these *Ideas* we have of them in us”.
13. By analogy with pain, we can conceive that the same is true of secondary qualities: “it being no more impossible, to conceive, that God should annex such *Ideas* to such Motions, with which they have no similitude; than that he should annex the *Idea* of Pain to the motion of a piece of Steel dividing our Flesh, with which that *Idea* hath no resemblance”.
14. Therefore, secondary qualities “are in truth nothing in the Objects themselves, but Powers to produce various Sensations in us, and *depend on those primary Qualities*”.
15. “From whence I think it is easie to draw this Observation, That the *Ideas of primary Qualities* of Bodies, *are Resemblances* of them...but the *Ideas, produced in us by these Secondary Qualities, have no resemblance* of them at all”.

The argument works in exactly the same way as Descartes’s. Primary qualities are, by definition, [1] inseparable from bodies and—what may be understood as an explication of the technical term ‘inseparability’—[2] in bodies regardless of what changes or alterations those bodies undergo. As such, the list of primary qualities includes solidity, extension, figure, number and motion or rest.²²

There are two criteria by which to determine whether or not a determinable quality satisfies the characteristics definitional of primary qualities. The *empirical criterion* [3], which applies only to bodies big enough to be perceived, disqualifies a property from primary quality status if we have ever actually perceived a body that lacks it. Locke suggests elsewhere in the *Essay* that colours fail to satisfy this criterion for primary quality status, as there are objects like diamonds, or, when viewed under a microscope, sand, pounded glass, and the liquor in which red globules found in the blood swim, that we

²² Number is not constant in Locke’s primary quality lists. Similarly variable is texture, which in the First Edition is first mentioned in II.viii.14, does not feature on the subsequent lists of II.viii.15, 16 or 17, and reappears again only in II.viii.18.

know to be pellucid.²³ However, even if we had never actually seen a body so pellucid as to lack colour, colours would still fail to qualify as primary qualities so long as they failed the second, *conceptual criterion* [4] for primary quality status. The conceptual criterion extends the empirical epistemic criterion first, to those macroscopic bodies that as a matter of fact we have never actually perceived, and more importantly, to the “good store of bodies” which are too small to perhaps ever be perceived, but which are nevertheless fundamental to mechanistic explanations of the interaction of macroscopic material bodies.

Consider, by way of illustration, solidity, the inclusion of which on Locke’s list of primary qualities marks an important theoretical disagreement between Locke and Descartes. Solidity satisfies the epistemic criterion for primary quality status because Locke thinks that we receive no idea more constantly from sensation than solidity. At the same time, it also passes the conceptual test for primary qualities because if the mind, having got the idea of solidity from macroscopic bodies, “traces it further...to the minuest Particle of Matter”, it will find that solidity is “inseparably inherent in Body, where-ever, or however modified”. In other words, according to Locke, we cannot conceive of a body that lacks solidity.²⁴

The qualities identified as primary in II.viii.9, via the procedure described in II.viii.10, constitute our conception of material substance. As such, they ground the inference to the impulsive action principle of II.viii.11, insofar as our conception of bodily interaction is determined by what we take bodies to be. From the fact that nothing in our conception of material substances explains how bodies could interact when they are not touching, for instance, it follows that we cannot conceive of bodily action at a distance. Instead, the only way in which we can conceive of solid, extended, figured, mobile material bodies operating on other such bodies is by impulse, and this is something which we can intelligibly conceive of occurring only on the occasion of their contact, as when one billiard ball strikes another, and thereby communicates its motion to it.

As for Descartes, Locke’s inference from bodily constitution to bodily interaction is underwritten by a commitment to intuitively certain causal likeness principles: first, that from nothing can come nothing, and second, the specific version of this principle,

²³ II.xxiii.11.

²⁴ II.iv.1.

that there must be at least as much “perfection” in the cause as there is in the effect.²⁵ These principles impose the constraint on the intelligibility of the causal relation that the cause be an entity of the right type to bring about the effect. As such, they rule out the possibility that the primary qualities of bodies produce qualities that differ fundamentally in kind to themselves; specifically, that primary qualities, which by definition [1] are *inseparable* from bodies, produce distinct *separable* qualities.²⁶ To suppose, like the Scholastics, that the inseparable primary qualities of bodies could ever produce a quality that is separable from material substance would be to suppose that what is less perfect could produce what is more perfect. It would also frustrate any pretensions that we might have of deducing *a priori* facts about the nature of bodily interaction from facts about bodily constitution. *A priori* deducibility requires universality: that the effects of a body’s primary qualities be always and everywhere the same. To guarantee this, inseparable primary qualities need to only ever produce changes in inseparable primary qualities.

Consistent with the impulsive action claim of II.viii.11, II.viii.12 offers an account of how we perceive the primary qualities of material bodies. According to Locke, perception occurs when material bodies interact with the sense organs by way of imperceptible particles that communicate motion from these objects to perceiving subjects. This motion is subsequently transmitted from the sense organs to the brain, and thereby excites in our minds primary quality ideas. Although Locke is more circumspect than Descartes in explaining exactly how motions in the brain are able to excite in our minds these ideas, the general similarities of Locke’s account to the Cartesian theory of sense-perception are striking. Indeed, in one of the few explicit references to any other philosopher in the *Essay*, Locke elsewhere even parodies Descartes’s analogical explanation of the propagation of light, explaining light as “nothing but a Company of little Tennis-balls, which Fairies all day long struck with Rackets against some Men’s Fore-Heads, whilst they passed by others”.²⁷

II.viii.13 extends the account of primary quality perception developed in section 12 to secondary quality perception. Using the same analogy between secondary quality sensations and pain sensations as Descartes, Locke argues that it is no more impossible

²⁵ See IV.x.3 and 10 respectively. That Locke’s argument for the primary-secondary quality distinction is supposed to be deductive is suggested by the analogy that he draws at IV.x.3 between the causal likeness principle—that nothing can come from nothing—and the proposition that nothing is not equal to two right angles, without which the paradigmatic deductive science, Euclidean geometry, would be impossible.

²⁶ Note, however, that in a departure from Scholastic terminology, Locke reserves the term “real” for the *inseparable* primary qualities of bodies, II.viii.17.

²⁷ III.iv.10.

to conceive that God should annex secondary quality sensations to corporeal motions with which they have no similitude than that he should annex pain sensations to the corporeal motion of “a piece of Steel dividing our Flesh”. In contrast, it *is* impossible to conceive that secondary quality sensations should be caused in any other way. In particular, it is inconceivable that the separable qualities that the Scholastics suppose denominate bodies could be transmitted from these bodies to perceiving subjects, thereby interact with their sense organs and produce in their minds the relevant experiences. There is therefore a *metaphysical distinction* between primary and secondary qualities. Secondary qualities are not really qualities at all, but are merely powers (or dispositions) to produce in us ideas, powers that depend on the primary qualities of objects. The corollary of this metaphysical distinction is the *conceptual distinction* that whilst our ideas of primary qualities “resemble” those qualities as they are in bodies, our ideas of secondary qualities do not.

By way of illustration, Locke then – and only then – introduces the infamous examples of the fire, manna, porphyry, almond and water, at II.viii.16-21. Consider, for instance, Locke’s discussion of the porphyry. A piece of porphyry, which produces in us sensations of red and white in the light, has no colour in the dark: this much is just supposed to be plain.²⁸ But what could possibly explain this alteration in the porphyry’s qualities? In virtue of what is it coloured in the light but colourless in the dark? We might think, for example, that colours are qualities that literally separate from material bodies in the dark; as Walter Charleton, an English follower of the atomist Gassendi describes the Scholastic position, that colours are properties “coherent to those superficial particles [of compound bodies], so as...to be actually separated from them, upon the absence of Light”.²⁹ But then the presence or absence of light would somehow have to explain this separation. Yet it follows from the argument of sections 9-15 that we cannot conceive of how the presence or absence of light *could* intelligibly explain this alteration. Given our conception of material substance, the only way in which we can intelligibly conceive of bodies interacting is by impulse. It is therefore only if colours are powers to produce in us sensations that depend on the primary qualities of an object’s insensible parts that we

²⁸ Although Locke thinks it just “plain” that objects have no colour in the dark, it is interesting to note that Boyle deemed the point worthy of experimental proof, describing an experiment that he conducted with the help of “an ingenious person (skilled in optics)” to determine whether or not snow is white in the dark. Needless to say, neither Boyle, nor his friend, “could find, that it had any other light than what it received”, 1664: 699.

²⁹ 1654: 185; Charleton does not, of course, himself endorse this position.

can understand how the porphyry undergoes the alteration that it does. Hence, colours are not qualities of objects, and our ideas of them do not resemble qualities of objects.

III. RESEMBLANCE

Before assessing the strength of these arguments for the primary-secondary quality distinction, it is worth briefly pausing to consider the argument's conceptual conclusion: the notorious claim that only our primary quality ideas "resemble" qualities of objects. At least partly on the basis of this claim, some commentators have attributed to Locke a veil-of-perception view according to which ideas are not only the immediate objects of perception, but bear *literally* the same determinable (if not the same determinate) primary qualities as the material objects for which they stand proxy.³⁰

It is worth stressing, however, that nothing in Locke's argument for the claim that only primary quality ideas resemble qualities of objects commits him to the view that ideas are literally square or yellow. Although at II.viii.12 Locke acknowledges that we perceive objects that are not "united" to our minds, he does not there say that if external objects are not united to our minds then there must be something - 'real beings', or ideas - that are. This is not the kind of 'wandering soul' argument that we find, for example, in Malebranche, who claims that if the immediate objects of perception were not "intimately joined to the soul" then the soul would have to leave the body and "stroll about the heavens" when it sees objects spatially distinct from itself.³¹ As far as Locke is concerned, the only thing that is "evident" when it comes to the perception of bodies external to the mind is that some motion must be communicated, by our nerves or animal spirits, from our sense organs to our brains, and there produce the particular ideas that we have of them. As to what these particular ideas are, Locke here remains neutral. Of course, this means that ideas could yet be real beings that are literally square and yellow. But, it does not follow that they are, as they could equally be modes or even something entirely different again.³²

³⁰ For a classic statement of this interpretation, see Reid 1785: II.xvii. This interpretation has recently been revived by Winkler 1992 and Jacovides 1999. It receives more qualified approval from Ayers 1991 i: 52-69.

³¹ 1674-5: III.2.1, 217.

³² Although Locke elsewhere professes to find the hypothesis that ideas are real beings, but neither substances nor modes unintelligible (1693a: §18), he does not definitively rule it out, being clear that, "God is not bound in all he does to subject his ways of operation to the scrutiny of our thoughts" (1693b: §2).

To see this more clearly, it is instructive to compare Locke's argument for the primary-secondary quality distinction with Descartes's. According to Descartes, ideas are modifications of immaterial substance.³³ To the extent that it makes sense at all to talk of modifications as being themselves literally modified, to suppose that a modification of immaterial substance is literally square would require at least that the substance of which it is a modification itself be literally extended. Yet, it is an essential property of immaterial substances that they are *unextended*. A 'square idea' therefore cannot itself be literally square. For a similar reason, neither can 'yellow ideas' be themselves literally yellow. As the more orthodox Cartesian Arnauld says in criticism of Malebranche's 'doctrine of the rainbow soul', for instance:

when it is said that the soul is yellow or green,...that would imply that the soul is something whose surface is covered with the colour green or the colour yellow, something that would be a far greater error than the one we are trying to avoid, since this would suggest that the soul is corporeal.³⁴

The important point here is that if it does not follow from Descartes's version of the argument for the primary-secondary quality distinction that ideas are literally square or yellow, and Locke's argument is a version of essentially the same argument, then it does not follow simply from Locke's version of this argument that ideas are the immediate objects of perceptual experience and bear qualities that literally resemble those of material bodies.³⁵

If the resemblance claim is not meant literally, then what do Descartes and Locke mean when they say that only primary quality ideas resemble qualities of objects? Setting aside questions about the metaphysical status of ideas, one suggestion is that "resemblance" should be understood at least in part metaphorically, as describing the functional role that ideas occupy. On this reading, to say that an idea "resembles" a quality of an object would be to say that it 'yields an intelligible conception of' that

³³ 1644: I.9; I.32.

³⁴ 1683: Chapter 23, 175.

³⁵ Note that Locke was well acquainted with Malebranche's views and the disputes these views engendered. During the period on which he was working on *Draft C* of the *Essay*, Locke's journals contain detailed notes on Malebranche's *Search After Truth* (7th January to 14th February 1684) and Arnauld's virulent attack on Malebranche, *On True and False Ideas* (15th March 1684; for details, see Bonno 1955). Later, when in the process of revising the *Essay*, Locke prepared one set of comments directed explicitly at the *Search*, and two sets of comments on the English follower of Malebranche John Norris, whose *Cursory Reflections upon a Book call'd an Essay concerning Human Understanding* was the first published critique of the *Essay*, appearing in 1690. A letter to Molyneux suggests that Locke prepared these comments with an eye towards adding a new chapter to the *Essay* (28th March 1693, de Beer 1976 iv: 665, no. 1620). Locke, however, never made the proposed changes, explaining his decision to Molyneux in a later letter, saying "I love not controversies, and have a personal kindness for the author" (8th March 1695, de Beer 1974 v: 287, no. 1857).

quality; or, in more explicitly Cartesian language, that it ‘yields a clear and distinct conception of’ that quality.

So, for example, colour ideas do not “resemble” qualities of objects because they do not enable us to intelligibly, or clearly and distinctly, conceive of properties of objects: as Descartes variously says, “If someone says he sees colour in a body...this amounts to saying that he sees...something there of which he is wholly ignorant”; there is no “intelligible resemblance” between colours considered as qualities of objects and sensations. Shape ideas, in contrast, “resemble” qualities of objects because they allow us to clearly and distinctly conceive what those qualities are like: “our knowledge of what it is for the body to have a shape is much clearer than our knowledge of what it is for it to be coloured”.³⁶ This metaphorical interpretation of “resemblance” fits Locke equally well, at least to the extent that Locke’s overarching concern in the *Essay* is not so much with ideas considered in themselves, but rather with ideas considered as the “instruments” of knowledge.³⁷ Our ideas of primary qualities “resemble” qualities of bodies insofar as they yield an intelligible conception of those qualities: we are, for example, able to intelligibly conceive of how objects could interact in virtue of these qualities. The same is not of true secondary qualities. We cannot conceive of how objects could interact in virtue of their secondary qualities. Since they do not yield an intelligible conception of any of an object’s qualities, secondary quality ideas do not resemble those qualities.

IV. SECONDARY QUALITIES

I have argued so far that Descartes’s version of the argument for the primary-secondary quality distinction resembles Locke’s. But there is also a striking difference: only Descartes’s version of the argument is actually valid.

For Descartes the inference from bodily constitution to bodily interaction at the heart of the argument for the primary-secondary quality distinction is guaranteed by the clear and distinct conception of particular material substances that sensory perception, working in conjunction with the intellect, affords. Locke, however, thinks that we lack the clear and distinct conception of material substance we need to underwrite this inference. For Locke, solid extended substance is ultimately “incomprehensible”, because we are unable to determine the nature of the “primary and supposedly obvious” quality

³⁶ See 1644: I.68-70. The present proposal builds on the interpretation of Descartes’s understanding of “resemblance” suggested by Wilson 1994.

³⁷ 1690: II.xxxiii.19.

of bodies on which extension and figure depend: the cohesion of a body's solid parts.³⁸ It follows that no less "obscure and unconceivable" is the only remotely intelligible conception of bodily interaction we can hope to achieve: a conception of the capacity of objects to receive and communicate motion by impulse, grasping which presupposes a grasp of what the cohesion of the parts of matter consists in. According to Locke, we therefore have no more detailed conception of impulsive bodily interaction as "of the passing of Motion out of one Body into another".³⁹

This poses a serious problem for Locke's argument for the primary-secondary quality distinction. Because our conception of material substance is ultimately obscure and confused, it does not follow from the fact that we conceive of bodies as extended, solid, shaped pieces of matter, either in motion or at rest, that this is what bodies actually are. In turn, because our conception of what bodies are determines our conception of how bodies interact, neither does it follow from the fact we can conceive of bodies as interacting only by impulse and on contact that bodies cannot interact in any other way.

The invalidity of the inference from bodily constitution to bodily interaction is graphically illustrated by the revision that Locke is forced to make in the Fourth Edition of the *Essay* to the impulsive action principle of II.viii.11. In response to Newton's "incomparable" *Principia*, Locke suppresses the explicit requirement that bodies communicate motion to other bodies only on contact. As he explains in his *Second Reply* to Stillingfleet, the Bishop of Worcester:

The gravitation of matter towards matter, by ways inconceivable to me, is not only a demonstration that God can, if he pleases, put into bodies powers and ways of operation, above what can be derived from our idea of body, or can be explained by what we know of matter, but also an unquestionable and every where visible instance, that he has done so.⁴⁰

But if bodies *could*, and even *do*, act in ways 'above what can be derived from our idea of body', why bodies couldn't act, albeit equally unintelligibly, in virtue of their secondary qualities? It begins to look as though Locke is himself guilty of the same "unfair way" that he remonstrates others for taking who, "because of the inconceivableness of something they find in one, throw themselves violently into the

³⁸ II.xxiii.26.

³⁹ See, for example, II.xxiii.28, IV.iii.14 and IV.iii.29.

⁴⁰ 1699: 467-8. It is natural to speculate that Locke interpolates the definition of secondary qualities at II.viii.10 in an attempt to obscure the supposedly deductive character of the argument of II.viii.9-15. If this was Locke's intention, then in light of the confusion that these sections have caused it is fair to say that he succeeded!

contrary Hypothesis, though altogether as unintelligible to an unbiased Understanding”.⁴¹

Indeed, this interpretative problem becomes still more pressing if we consider the explicit role that the “little Excursion into Natural Philosophy” of II.viii plays in the *Essay* as a whole.⁴² The primary-secondary quality distinction is introduced to emphasise the difference between ideas and qualities, and with it the distinction between the inquiry into ideas as they are in the understanding, with which the *Essay* is concerned, and the inquiry into the nature of things as they are in themselves, which falls outside the scope of the *Essay*.⁴³ To merely emphasise this distinction, however, it is unnecessary for Locke to actually assert the primary-secondary quality distinction; it would be enough to merely conditionally assert it. More generally, establishing the existence of a substantial metaphysical distinction between primary and secondary qualities is surely irrelevant when it comes to securing our knowledge of the great ends of morality and religion, with which above all else the *Essay* is concerned. Secondary qualities ideas contribute towards the great ends of morality and religion merely by enabling us to distinguish and re-identify particular material bodies. Locke, however, thinks that they could do this whether they were “a particular Texture of Parts” or else “that very Colour, the *Idea* whereof (which is in us) is the exact resemblance”: in other words, whether there were a metaphysical distinction between primary and secondary qualities or not.⁴⁴

Locke’s problems on this point ultimately stem from his rejection of the Cartesian bifurcation of the mental into distinct sensory and intellectual perceptual faculties. For Descartes, the clarity and distinctness of the conception of individual material substance that we form via the senses, and which grounds the inference to the primary-secondary quality distinction, depends crucially on the interplay between the sensory and intellectual faculties: it is only “as a result of sensory stimulation”, and not through “sensory awareness” alone, that we clearly and distinctly perceive particular material bodies.⁴⁵ By rejecting this bifurcation of the mental, Locke puts a clear and distinct conception of material substance beyond us. The senses alone cannot furnish us with any such

⁴¹ IV.iii.6.

⁴² II.viii.22.

⁴³ See, for example, II.viii.2 and II.viii.7.

⁴⁴ II.xxxii.14.

⁴⁵ 1644: II.1. Compare the distinction between the second and third grades of sensory response in the *Sixth Replies* and the account of distance perception in the *Dioptrics*, 1637: VI.

conception, because they are “scarce acute enough to look into the pure Essences of Things”.⁴⁶ And without a clear and distinct conception of material substance, the conceivability claims on which Locke’s argument for the primary-secondary quality distinction rest cannot establish the metaphysical conclusion of this argument: we can infer neither from our conception of body to the nature of material substance, nor from the nature of body to the nature of bodily interaction.

Yet at the same time, part of what makes Locke’s version of the primary-secondary quality distinction so attractive is *precisely* that he rejects the Cartesian bifurcation of the mental into distinct sensory and intellectual faculties. The bifurcation of the mental makes it notoriously difficult to accommodate sensation, and secondary quality sensations in particular, within the Cartesian framework. The temptation, to which Descartes typically succumbs, is to treat sensations as elements of perceptual experience distinct from the judgements made about them by the intellect (as he does, for example, in the passage from *Principles* II.1 quoted at the end of §1). According to this way of thinking it is natural to treat sensations as modes of neither the intellectual mind nor the extended body, but of a third thing, the mind-body union, which constitutes a substance distinct from both the body and the mind and is that to which sensations are properly referred. Indeed, Descartes himself sometimes appears to treat sensations in this way, most famously when he explains to Princess Elizabeth of Bohemia that we have a “primitive notion” of the substantial union between soul and body, much as we have primitive notions of both the mind and the body. But, of course, this cannot be Descartes’s considered view because it violates his commitment to a strict substance dualism.⁴⁷ The official Cartesian view is rather that *all* ideas, including sensations, are modifications of immaterial substance. And this now threatens to make sensory perception just a degenerate case of intellectual perception. But to the extent that we think of pure intellectual perception as propositional and non-imagistic, this makes it difficult to respect the distinctive phenomenological character of sensory perception.

Generally speaking, it is not enough that the perceiving mind in which colour sensations are located differ in kind to the material world from which qualities resembling these sensations are expunged. If colours are to be downgraded to the

⁴⁶ 1690: II.xiii.24.

⁴⁷ Descartes to Elizabeth 21st May 1643, CSMK: 218. Cottingham suggests that Descartes is not a substance dualist but a merely an “attribute dualist”, 1986: 127-32. But although this is not in clear tension with Descartes’s substance dualism, it doesn’t really address the fundamental problem of explaining the distinctively sensuous nature of sensation: if neither mind nor body are alone well suited to explain the nature of sensation, then how can they explain it together?

secondary quality status of dispositions to produce in us sensations, then the mind must itself be able to accommodate these sensations: the ‘ontological dustbin’ has to be up to the task.

It should be fairly clear that if there is a problem about how to square the existence of qualities resembling our sensations with the nature of material substance, then it is no better to locate colour sensations in a purely material mind. As Thomas Wise, in his abridgement of Cudworth’s *True Intellectual System*, observes, there is almost a logical connection between mechanism and mind-body dualism:

the inward Constitution of [corpuscular] *Philosophy* is also such, that whosoever really entertains it and rightly understands it, must of necessity admit Incorporeal Substance...according to this *Philosophy* the corporeal *Phaenomena* themselves cannot be solv’d by *Mechanism* alone without *Fancy*: Now *Fancy* is no Mode of *Body*, and therefore must needs be a Mode of some other kind of Being in our selves, which is cogitative and incorporeal.⁴⁸

At the same time, however, it does not represent much of an advance over materialism to locate colour sensations in a non-material mind that is itself incapable of accounting for the distinctive phenomenology of sensory perception. In effect, Descartes’s problem is that his essentially intellectual mind is no better able to accommodate the sensations that secondary qualities are dispositions to produce than the material world from which qualities resembling these sensations are eliminated in the first place. The only way in which Descartes can respect the distinctively sensuous nature of sensation is if he predicates sensations of a third substance, the mind-body union. But this avenue is foreclosed by his strict ontological dualism.

In this respect, Locke’s account of the primary-secondary quality distinction is much more attractive. By denying the existence of a distinct intellectual faculty, Locke avoids any difficult questions about the relationship of the senses to the intellect, thereby removing any temptation to treat sensation as a merely degenerate case of intellectual perception. Rejecting the existence of a rational intellect may mean that we lack the cognitive capacities to conclusively determine whether mind and body are distinct, or for that matter whether there is a metaphysical distinction between primary and secondary qualities. But mind-body dualism and the primary-secondary quality distinction at least come out as attractive hypotheses, given their ability to account for the distinctive phenomenology of sensation.

⁴⁸ 1706: 24-5.

One of the things that makes Locke's account of the primary-secondary quality distinction attractive is therefore precisely that in virtue of which his argument for this distinction is invalid. It is precisely *because* he rejects the Cartesian distinction between the sensory and intellectual perceptual faculties that Locke's argument for the distinction is at once invalid, and yet more compelling than Descartes's valid version of same the argument. Rejecting the Cartesian bifurcation between the senses and the intellect, whilst at the same time accepting a fundamental distinction between mind and matter, allows Locke to respect what is phenomenologically distinctive about secondary quality perception.⁴⁹

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⁴⁹ A version of this paper was presented at the John Locke Tercentenary Conference in Oxford. Many thanks to the participants for their perceptive and instructive comments and questions. Thanks to Shigeyuki Aoki for detailed written comments, and to Mark Kalderon, Mike Martin and Paul Snowdon for extensive discussions of these, and related, issues. This research was made possible by financial assistance from the Arts and Humanities Research Board.

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