Two chapters on Issues in Empiricism

Jonathan Bennett

Secondary Qualities

Chapter 25 of *Learning from Six Philosophers*, (Oxford University Press, 2001), pp. 74–91.

187. Locke's corpuscularianism

Locke was attracted by the kind of physics he called 'the corpuscularian hypothesis'[1]—the hypothesis that the physical world can be comprehensively explained in terms of how corpuscles are assembled into larger structures and how they move. One naturally thinks of the 'corpuscles' as atoms, unsplittable physical minima, but Locke does not confidently do so. Let us consider his troubles with atoms.

Like Descartes, Leibniz, and others at his time, Locke did not believe in attractive forces.[2] That left him, as he knew, unable to explain how bodies hang together so that there are rocks and grains as well as air and water (II.xxiii.23–7). This encouraged the view that there are no atoms because every portion of matter can be divided into still smaller bodies.

Just once Locke openly embraces that conclusion and affirms the infinite divisibility of matter. He is discussing whether God could be a material thing:

> Though our general or specific conception of matter makes us speak of it as one thing, yet really all matter is not one individual thing, neither is there any such thing existing as one material being, or one single body that we know or can conceive. And therefore if matter were the eternal first cogitative being, there would not be one eternal infinite cogitative being, but an infinite number of eternal finite cogitative beings. (*Essay* IV.x.10)

In this astonishing passage Locke implies that every material thing is divisible into an infinite number of basic parts; he calls them 'beings' but drops the adjective 'material' because if they were material they would be extended, so divisible, so unbasic. He here goes a good distance with Leibniz, but unlike him supposes that an extended thing can have unextended things as its ultimate parts (§88). This lets him work his way down to the simple substances, parting company with Leibniz in relating them to bodies as parts to wholes, not as reality to appearance. I do not make much of this passage, however. It was added in the second edition, and Locke seems to have made no other revisions in the

[1] *Essay* 547:29; references in that form to the *Essay* are to page and line of the Nidditch edition (Oxford University Press).

[2] See §23; references in that form are to other sections of *Learning from Six Philosophers*, from which the present text is an excerpt.

light of it. In the *New Essays*, incidentally, Leibniz quotes it without comment.

More often we find Locke writing like a convinced atomist, most notably in II.xxvii.3 where he implies that the material world is composed of 'atoms' that can be neither split nor deformed. That is shown not just by his using the word 'atom', but by the structure of his thought in this chapter. He wants to explain what it is for a single F to last through time, for various values of F, ending famously with F = person (Chapter 39). He starts with F = atom, and handles it without mentioning parts; then he turns to F = mass-of-matter, saying that mass x is mass y if and only if x has exactly the same atomic parts as y. So he first gets atoms on board in his analytic project, and then starts to use the concept of a part. This would be merely incompetent if he thought of 'atoms' as having separable parts.

These divergent performances of Locke's result from bafflement. On the one hand, matter must be divisible; on the other, we have no notion of infinite division. Take these passages in order:

- Since in any bulk of matter, our thoughts can never arrive at the utmost divisibility, therefore there is an apparent infinity to us. . . in that. (*Essay* II.xvii.12)
- In matter we have no clear ideas of the smallness of parts much beyond the smallest that occur to any of our senses: And therefore when we talk of the divisibility of matter in infinitum, though we have clear ideas of division and divisibility,. . . yet we have but very obscure and confused ideas of [the parts of bodies which are] reduced to a smallness much exceeding the perception of any of our senses. (xxix.16)
- The divisibility in infinitum of any finite extension involv[es] us, whether we grant or deny it, in consequences impossible to be explicated or made in our apprehensions consistent. (xxiii.31)
- We are at a loss about the divisibility of matter. (IV.xvii.10)

The main topic of the present chapter is unaffected by this issue on which Locke wavers so unhappily. All we need is to allow him the notion of micro-structures whose elements are corpuscles of some kind; whether these are thought of as atoms, as splittable but held together by attractive forces, or as held together in some inexplicable manner, will not affect the main lines of the discussion.

188. The corpuscularian thesis about what secondary qualities are

Now, the corpuscularian hypothesis—or Galilean or Cartesian ideal—has to maintain that the qualitative differences amongst material things are really differences in micro-structure. Across some of the territory, that is easily intelligible (§2), but it is not obvious how this could be so for the properties of things that Boyle called 'secondary'. This apple is green, is sweet, is cold; what have such properties as these to do with structures? Let us look at what became the standard answer to this, attending mainly to Locke's version of it.

I shall assume that Locke and his Galilean predecessors each meant to have *one* doctrine about primary and secondary qualities: it may have had several parts or sub-themes, but they were supposed all to be related to a central thesis. I apply that claim to most of the 'twenty odd ways of making a distinction' that are sorted out by MacIntosh.[1] Without claiming to match MacIntosh's knowledge of the

[1] John J. MacIntosh, 'Primary and Secondary Qualities', *Studia Leibnitiana* 8 (1976), 88–104.

history of this matter, I stand by my resolve to find the one distinction that stands at the centre of what is *philosophically interesting* in the primary/secondary distinction. Our first task is to locate this central thesis among all the conflicting statements of Locke and others concerning the topic. Here are the things Locke affirms of secondary qualities and denies of primary ones.

(1) They are dispositions to cause a characteristic kind of sensory state in percipients. 'Secondary qualities. . . are nothing but the powers those substances have to produce several ideas in us by our senses' (*Essay* II.xxiii.9). '[We speak] as if light and heat were really something in the fire more than a power to excite these ideas in us; and therefore are called qualities in or of the fire. But these [are] nothing in truth but powers to excite such ideas in us' (xxxi.2).

(2) They are not in outer objects. 'Yellowness is not actually in gold. . . ' (xxiii.10).

(3) They are not intrinsic to the objects that have them, but rather are relations between those objects and something else. The yellowness, solubility etc. of gold 'are nothing else but so many relations to other substances, and are not really in the gold considered barely in itself' (37).

(4) They are in minds rather than in outer objects. 'Light, heat, whiteness or coldness are no more really in them than sickness or pain is in manna. Take away the sensation of them; let not the eyes see light, or colours, nor the ears hear sounds; let the palate not taste, nor the nose smell; and all colours, tastes, odours, and sounds, as they are such particular ideas, vanish and cease' (viii.17).

(5) The ideas of them do not resemble anything in the physical world, as do ideas of primary qualities. '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. There is nothing like our ideas existing in the bodies themselves' (15).

I contend that the core we are looking for is **(1)** the thesis that secondary qualities unlike primary are dispositions to cause characteristic sensory states in percipients. For Locke and also for Descartes, Boyle, and the others, this was the central, basic, most considered view about how the two sorts of qualities differ.

My first reason for this, so far as Locke is concerned, is textual: there is more of **(1)** than of any of the others in the *Essay*. I have quoted two instances. Here are five more:

- Secondary qualities [are] qualities which in truth are nothing in the objects themselves but powers to produce various sensations in us by their primary qualities. (II.viii.10)
- Colours and smells [and] tastes and sounds, and other the like sensible qualities. . . . are in truth nothing in the objects themselves but powers to produce various sensations in us. (14)
- [Secondary qualities are] the powers to produce several ideas in us by our senses. (24)
- Gold or saffron has a power to produce in us the idea of yellow, and snow or milk the idea of white. (xxi.73)
- We immediately by our senses perceive in fire its heat and colour; which are, if rightly considered, nothing but powers in it to produce those ideas in us. (xxiii.7)

My second reason is philosophical: of the five theses about secondary qualities, **(1)** comes closest to being true. I shall say more about this later. My final reason is structural: we can understand a philosopher's entertaining any of the other theses by treating it as an outgrowth from or slight

mishandling of **(1)** the central thesis. None of the others can play this part as a central organizer of all Locke's disparate pronouncements about secondary qualities. I shall now defend this, showing that in attributing **(1)** to Locke we can mop up **(2)**, **(3)** and **(4)** by treating each as a slight mishandling of **(1)**. I shall return to **(5)** in §193.

To illustrate **(2)**, I quoted a fragment from this: 'Yellowness is not actually in gold, but is a power in gold to produce that idea in us by our eyes, when placed in a due light.' This seems internally inconsistent—yellowness is not actually in gold but is (a power) in gold—but everything comes right if we suppose that by 'is not actually in gold' Locke meant 'is not an actuality in gold'. Then he is merely saying that yellowness is a power or disposition, which brings **(2)** within the compass of **(1)**.

With regard to **(3)**: according to **(1)** a secondary quality is not a relation between its bearer and something else, but it *involves* a relation, because it is a disposition that its bearer has to *relate causally* to something else. So a mild stretch brings **(3)** under **(1)**.

There is more difficulty with **(4)**, which identifies secondary qualities with ideas rather than with dispositions to cause ideas. Here I think Locke has made a mistake: like Galileo and Descartes before him, he has *slipped* from **(1)** to a different thesis. Consider this passage:

> The power that is in any body... to operate after a peculiar manner on any of our senses, and thereby produce in us the different ideas of several colours, sounds, smells, tastes, &c. These are usually called sensible qualities. (II.viii.23)

This has 'power' (singular) and 'ideas' (plural). The second sentence ('These...') relates to the ideas, where it should have related to the power. That is, Locke should have written: 'The power that is in any body... [etc.] This is usually called a sensible quality.' Here is a more complex and subtle example:

> Sweetness and whiteness are not really in manna; [for they] are but the effects of the operations of manna, by the motion, size, and figure of its particles on the eyes and palate: as the pain and sickness caused by manna are confessedly nothing but the effects of its operations on the stomach and guts. (18)

What Locke ought to be doing, according to doctrine **(1)**, is to compare the manna's *whiteness* with its *emeticness*, that is, its tendency to make people sick. Each of those is a disposition to have a certain effect on people. Locke has misfocused slightly, however, and has attended not to manna's emetic quality but to the sickness that it causes; and that has led him on the other side of the analogy to focus on the *idea of white* instead of on the *whiteness*.

There are many **(4)**-like passages. It is uncomfortable to treat them all as resulting from Locke's misunderstanding his own central thesis, but I see no escape from this. Consider another example. After providing a prime example of **(1)**, quoted above, about light and heat as a power that the fire has to cause certain ideas in us, Locke continues thus:

> Were there no fit organs to receive the impressions fire makes on the sight and touch, nor a mind joined to those organs to receive the ideas of light and heat by those impressions from the fire or sun, there would yet be no more light or heat in the world than there would be pain if there were no sensible creature to feel it. (II.xxxi.2)

This is a slide: from treating heat as a power that the fire has, Locke has drifted into regarding it as an effect of that power. And on the other side, he has gone from comparing heat with the fire's property of being 'painful to the touch' to comparing it with the pain that the fire causes. Read that section carefully and you will *see* Locke sliding.

He is not alone in this. Galileo[1] maintained that secondary qualities do not fall within the scope of physics because they are mental, are 'subjective' properties that 'one is under no compulsion' to attribute to bodies, or 'are merely psychic additions of the perceiving mind'.[2] This insulates them from physics, all right; if it were true, it would solve the problem for Galilean physics; but it is a sadly implausible solution. I do not think that anyone could be attracted to it once he had conceived of the correct solution, which gives to secondary qualities all the subjectivity that is needed, while still attributing them to the objects that we intuitively think possess them.

Anyway, within **(1)** through **(4)** *something* has to give, because those formulations clash. If we are to avoid concluding that on this subject Locke and the others flailed around with no control from any basic considered view, we must somehow bring **(1)** through **(4)** into harmony. My way of doing so is conservative, requiring less rewriting and less attribution of error than any other.

According to Locke's central thesis, then, this is true of each secondary quality Q and of no primary quality Q:

> There is a kind K of idea or sensory state such that for an object to have Q is for it to be disposed to cause K states in normal percipients in standard circumstances.

(Must it be the same kind of idea for each percipient? Perhaps not. In II.xxxii.15 Locke considers whether marigolds might look to you as violets do to me. We could allow for that by revising the formula:

> For an object to have Q is for there to be, for each normal percipient, a kind K of idea or sensory state such that: the object is disposed to cause K states in that percipient in standard circumstances.

I shall skip this detail from now on.**)** Thus, what makes it the case that a given thing is red is the fact that if a normal person confronted it in sunlight with his eyes open, it would cause in him a red-type idea or sensory state. Locke never mentions the condition of the percipient, and says little about the conditions in which the perception takes place; but the qualification 'standard' or 'normal' is needed for the account to be roughly right, and it does not conflict with anything he says.

189. Why the central thesis is true

It is natural to see Locke's central thesis as implying that secondary so-called qualities are not really *qualities* but *powers* of the things that have them; unlike primary qualities, which really are qualities and not merely powers. Locke would not agree with that. He is willing to count a thing's powers as a subset of its qualities, if only 'to comply with the common way of speaking' (I.viii.10). When he says that a fire's power to melt wax 'is as much a quality in fire' as its redness, he is nudging us into calling both of them 'qualities'.

He sometimes hints that all qualities are powers, but I do not think he consideredly thought so. If he did, the upshot would be this:

> A quality is a thing's power to effect changes in things, i.e. to alter their qualities, i.e. to alter their powers to

[1] Galileo Galilei, *The Assayer* (1623), partly reprinted in S. Drake (ed), *Discoveries and Opinions of Galileo*, Garden City, NY: Doubleday, 1957, 231–80. The reference in the text is to p. 274.

[2] These are quotations from s. Drake, 'Galileo Galilei', in Paul Edwards (ed.), *Encyclopedia of Philosophy* 1963 (New York: Macmillan), p. 265b; and Stephen Gaukroger, *Descartes: an Intellectual Biography* (Oxford University Press 1995). p. 345.

> effect changes in things, i.e. to alter their qualities, i.e. to alter. . .

and so on ad infinitum. This is certainly peculiar, but perhaps it is not absurd. It yields a world where nothing is ultimately and non-dispositionally F; either there is no ground floor, or if there is one it consists purely of things and their powers. There are properties, according to this view, but a thing's having a property is just its having a power to confer or gain various other powers in interaction with other things. Shoemaker has defended this: 'What makes a property the property it is, what determines its identity, is its potential for contributing to the causal powers of the things that have it.'[1] It is certainly true that our only way of knowing what qualities a thing has is by knowing what its powers are; and although we can insist that the powers are only manifestations of the underlying quality, that smacks of metaphysical excess. So Shoemaker can make a case for his position, and there is in fact an ongoing debate about this. Locke did not mean to go so far; but I have mentioned this matter as a lead-in to a crucial point about secondary qualities—the point about them that makes the central thesis true.

What is special about such qualities is not merely that they are powers but *what* powers they are. Their specialness would not be lost if primary qualities were also powers, because they would be ones of a wholly different sort. A thing's being spherical, for instance, not only disposes it to cause a characteristic kind of visual state in normal percipients, but also gives it countless other well-known powers: it relates in predictable ways to measuring equipment, rolls smoothly on smooth surfaces, has a circular cross-section, leaves hemispherical indents in soft wax, and so on. If sphericalness is a power, it is the sum of all those powers and of many others. This is a richer set of powers than are associated with secondary qualities, especially colours; it differs also in that many of its members are powers to affect (not percipients' sensory states but) other material things.

The underlying fact is that the secondary qualities of things are almost epiphenomenal. I shall explain this in terms of colours, though it applies to the other secondary qualities as well. For most kinds K of thing, most of what we can infer about x's behaviour from the information that *x is K and red* can also be inferred from *x is K*. In contrast with that, information about a thing's shape or size is relevant, in gross unignorable ways, to its causal relationships with other things, so that if you try to envisage a shape or size analogue of colour-blindness, the story collapses under its own weight: you cannot inhabit the physical world without knowing the sorts of facts that will let you discover—in many ways—whether a given object is cubic or spherical or whether one thing is bigger than another.

It is because colours are so nearly epiphenomenal that colour-blindness can go undetected throughout a lifetime. The earliest record of it occurred in 1794, when the chemist John Dalton reported it in himself; but nobody thinks he was the first. Try to imagine someone having an analogous sensory defect, preventing him from grasping properly the difference between larger and smaller things, or straight and crooked edges! The story is almost untellable, and cannot be told in such a way that the afflicted person would not notice that there was something wrong. This is a point about the primary qualities in general; it is not lessened by the fact that 'it doesn't make much difference whether we perceive,

[1] Sydney S. Shoemaker, 'Causality and Properties', reprinted in his *Identity, Cause and Mind: Philosophical Essays* (Cambridge University Press, 1984), pp. 206–33, at p. 212.

say, soap bubbles as spherical or ovoid'.[1]

The nearly epiphenomenal character of colours, tastes and smells is not possessed by extreme differences of temperature: when metals are hot enough they become flexible; many things when hot enough catch fire; very cold water turns solid; and so on. We have to suppose that when the Galilean philosophers included heat among the secondary qualities, they saw it as problematic only in the range of the temperature scale in which differences in temperature do not make much obvious difference to most things except for how they feel; and their account of secondary qualities holds only for that middle range. Descartes implicitly acknowledges this when he writes of 'heat and other qualities perceived by the senses, in so far as those qualities are in objects' that 'we often see these arising from the local motion of certain bodies and producing in turn other local motions in other bodies'.[2] My account of this whole matter is not refuted by the fact that large-scale differences of temperature are nowhere near to being epiphenomenal.

Colours and other secondary qualities, I have said, are *almost* epiphenomenal. There is just one large, well-known upshot of a thing's being K and red (for almost any K) that is not an upshot of its being K; I refer to how the thing looks, that is, what visual states it is apt to produce in people when they confront it with eyes open in sunlight. A thing's being spherical has hundreds of obvious upshots; a thing's being red has just this one. That makes it reasonable to say that a thing's being red is just its being disposed to (for short) look a certain way, whereas all there is to a thing's being spherical is its being disposed to. . . and we must fill the gap with hundreds or thousands of propositions about how spherical things interact with other things, what results when they are cut in half, and so on. Thus, we can treat sphericalness as a disposition yet still have a double contrast between it and redness: between a simple power (redness) and a highly complex one (sphericalness), and between a power to affect minds (redness) and a power to affect minds and bodies (sphericalness).

Let me now amend my account. Strictly speaking, nothing can be nearly but not completely epiphenomenal, for any effect can be amplified. If the light had been red, the driver of the car would have had a visual sensation which caused him to stop; but in fact it was green, giving him one which caused him to go on driving; this led to his being hit by a train and killed; which led to war. The crucial point, however, is that all the other effects came *through* the sensory one: the sensory states of perceivers are the bottle-neck through which the secondary qualities affect the world.

190. A difference of kind

Critics such as Mackie[3] have contended that my account, which has to do with the degree to which various qualities are epiphenomenal, cannot have been what moved Locke because he thought that between primary and secondary qualities there is a difference of kind. I might reply that the epiphenomenalness difference is one of kind, rather than degree. Three bases for this have been suggested to me.

(i) Our access to each secondary quality is through only one sense while our access to each primary quality is through two, sight and touch; and this difference comes into my

[1] Margaret D. Wilson, 'History of Philosophy in Philosophy Today; and the Case of the Sensible Qualities', *Philosophical Review* 101 (1992), pp. 101-243, at p. 218.

[2] *Principles of Philosophy* 4:198.

[3] J. L. Mackie, *Problems from Locke* Oxford University Press, 1976; at pp. 33–4.

account of the epiphenomenalness difference between the two. I cannot adopt this defence, though, for my basic case for distinguishing primary from secondary qualities can be made purely in terms of touch-and-movement; a congenitally blind person could agree with it on the strength of what he knew for himself, without borrowing from what he was told by sighted people. There are also other obstacles to the proffered defence, coming from the fact that an apple can look soft, cheese can smell blue, and so on.

(ii) My epiphenomenalness contrast brought out the fact that while colour-blindness and its secondary-quality cousins are possible and even actual, a thoroughly developed primary-quality analogue of them turns out to be unintelligible; so there is a difference of kind—that between being and not being intelligible. The critic could reply that my difference is still one of degree, because it leaves open the possibility of a kind of quality which fits into the world in such a way that the relevant kind of 'blindness' to it is *barely* intelligible or *very hard* to make sense of. That would be a fair reply.

(ii) The difference that is brought out by my epiphenomenalness contrast is a very large difference in degree, and our name for that is 'difference of kind'. I accept this: I see it as an important truth, and not a mere claptrap, that differences of kind differ from ones of degree only in degree. And this is made easier to maintain if differences of degree are taken to include (in the manner of the last point in **(ii)** above) ones where there is a sheer precipice at the actual world and gentle slopes only at other possible worlds. But I shall not rest my defence purely on this point either. Here is why.

The difference that I have brought to the surface is one of degree, in the sense that it allows for the possibility that a quality might be *fairly secondary* or *pretty thoroughly primary*. We can envisage a physical world in which surfaces varied along the smooth-rough continuum only in ways that made barely perceptible differences to how things interacted, though they were easily detected through touch. At such a world, smooth/rough would be a fairly secondary quality; and it is a simple exercise to slide across the worlds so as to make smooth/rough thoroughly secondary or (in the other direction) thoroughly primary. I contend that this is, when you reflect on it, plainly the case about the distinction that Locke draws. If he did not notice that it was ultimately one of degree, that was his failure; it does not mean that he was thinking accurately about some other distinction.

The point I have been making is echoed in Locke's own treatment of smooth/rough. In II.iii.1 he discusses 'ideas which have admittance only through one sense which is peculiarly adapted to receive them'. He cites light and colours, sounds, tastes, smells, and then turns to qualities 'belonging to the touch', of which he instances heat and cold, solidity, smooth and rough, hard and soft, tough and brittle. There is much to criticize here, but let us focus on 'smooth and rough': in making this qualitative dimension relate to one sense only, Locke implies that the reality of it is given by how it feels. If he let it bear equally strongly on the implications of smooth/rough for the thing's interactions with other things, he would have to admit sight into the picture (and also allow touch a greater role). Yet in other contexts he seems to imply that rough/smooth belongs on the primary-quality side of the line, as when he includes among the primary-quality facts the ones about 'what kind of particles [there are] and how ranged in the superficies' (II.viii.2). Later, discussing the question of 'what primary qualities of any body produce certain sensations or ideas in us', he speaks of 'what sort of figure, bulk and texture of parts in the superficies of any body were fit to give such corpuscles their due motion to produce [a yellow] colour'.

The microstructures of physical surfaces are primary; and they *could* show up in interactions between material things; but evidently Locke thinks of them as showing up only in tactual feelings, which gives them a status like that of the official secondary qualities. This does not acknowledge that the difference is one of degree; but it shows sensitivity to the facts that make it so.

191. How Locke defends the central thesis

What makes Locke's central thesis about secondary qualities true, I submit, is the latter's being so near to epiphenomenal, having few large, immediate, obvious causal implications other than their sensory effects on us. Locke does not explicitly say this; I do not know of anyone who said it before I did;[1] but Locke must have been subliminally cognisant of the facts that I have adduced, and I think he was guided by them. If someone had put to him the possibility of colour blindness, asking whether it makes sense to suppose that this might occur and remain undetected (though not undetectable), I am sure he would have said Yes, because of his grasp of the facts about colour which I have brought to the defence of the central thesis.

When Locke says, as he frequently does, that if there were no colour-vision there would be no colours, he is not strictly right: the power to have a certain effect on suitably equipped perceivers is not lost merely by there being none; just as sugar can be soluble in tea even if there is no tea. Still, we can see him in these passages as aiming for the point that apart from the effects of colour on vision we have *no use* for the concept of colour, whereas our primary-quality concepts have plenty of uses apart from how those qualities affect our senses. That is how I understand the passage where, having said that if there were no colour-vision 'there would yet be no more light. . . in the world than there would be pain if there were no sensible creature to feel it', Locke continues with this contrast: '. . . though the sun should continue just as it is now, and Mount Aetna flame higher than ever it did. Solidity and extension and. . . figure, with motion and rest, whereof we have the ideas, would be really in the world as they are, whether there were any sensible being to perceive them or no' (II.xxxi.2). This, I submit, is the writing of a man who has taken in that secondary qualities are nearly epiphenomenal while primary ones are not.

If we look to Locke for outright arguments in support of the thesis, we find little, most of it weak. The three arguments in II.viii.19-21 are the bulk of what he offers to support the central thesis, and all are defective, though in different ways. In 19 he writes that porphyry loses its colour in the dark, but no-one could 'think any real alterations are made in the porphyry, by the presence or absence of light'; so that change of colour is not a real change in the porphry; so 'whiteness or redness are not in it at any time'. This assumes that colours are ideas, and so go out of existence when the ideas stop. Remove that mistake—allow that porphyry has colour in the dark—and the argument dissolves. In 20 Locke writes: 'Pound an almond, and the clear white colour will be altered into a dirty one, and the sweet taste into an oily one. What real alteration can the beating of the pestle make in any body, but an alteration of the texture of it?' This argues that an almond's colour and taste are mere upshots or symptoms of its primary-quality 'texture', *since the latter is all that can be altered by pounding*. Suppose we object that on the contrary pounding can also cause changes in a thing's secondary qualities, as is shown by Locke's own example. He can have no answer to this other than a general

[1] Jonathan Bennett, 'Substance, Reality and Primary Qualities', *American Philosophical Quarterly* 2 (1965) pp. 1–17.

appeal to the corpuscularian ideal for physics; and that is such a giant stride towards the central thesis that this argument should not convert anyone.

In Section 21 Locke says that with the central thesis in hand 'We may be able to give an account, how the same water at the same time may produce the idea of cold by one hand and of heat by the other'. He is right: a corpuscularian version of the central thesis does yield at least a schematic explanation for this fact, making an initially puzzling phenomenon 'easy to be understood'; and this possible explanatory success counts a little in favour of the thesis.

That modest argument seems to be mingled with something bolder and more vulnerable. Locke writes: '. . . and of heat by the other; whereas it is impossible that the same water, if those ideas were really in it, should at the same time be both hot and cold.' A little later he writes: 'Water may at the same time produce the sensation of heat in one hand and cold in the other, which yet figure never does, that never producing the idea of a square by one hand which has produced the idea of a globe by the other.' In these remarks he seems to infer from the premise that *the two-hands phenomenon obtains with warmth and not with shape* the conclusion that *the central thesis is right in how it draws the line between warmth and shape*. Crediting Locke with arguing in that manner, Berkeley denied the premise, pointing out that we *do* see and feel shapes, sizes etc. differently according to where and how we are. He instances the fact that one thing can feel like two, and that something circular may look square. Locke could have defended a version of the argument thus: 'It is true that one's perception of primary qualities can vary according to circumstances, and I was wrong to imply otherwise. Still, I had a point. Even if one coin held in the hand in a certain way feels like two coins, its being just one shows up in a multitude of ways other than how it feels. Again, the tower might look circular from over there and square from over here, but there is ever so much more to its being (in fact) circular than merely how it looks. That is how primary qualities differ from secondary ones.' A rescue of his argument along those lines would be tantamount to relying on the fact that secondary qualities are nearly epiphenomenal.

We are at the end of what Locke has to say in defence of the central thesis. He affirms several times in the *Essay* that primary qualities are essential to matter while secondary ones are not, as when he writes that the 'original or primary qualities of body' are the properties which 'are utterly inseparable from the body in what estate soever it be; such as in all the alterations and changes it suffers, all the force can be used upon it, it constantly keeps' (II.viii.9). He means that you cannot stop bodies from having some shape, some size, some velocity, some degree of hardness, and so on. This thesis is sometimes taken to have a central role in Locke's main doctrine about the two sorts of qualities; but it does not, and there is no evidence that he thought otherwise.

Given that shape is essential to matter as such, it is to be expected that its determinates—sphericalness and the like—will not be virtually epiphenomenal as the secondary qualities are. But the converse does not hold. A property that only some bodies have might nevertheless be basic in the bodies that do have it, and might contribute in richly complex ways to the bodies' causal interactions with other bodies (§2). Electric charge is perhaps an example. Such a quality would be 'primary' in the sense laid down by the central thesis, without being essential to matter. This is indeed the situation that physics has reached today, in which there are thought to be several *basic* kinds of constituents in matter, so that not all the key terms of basic physics concern

properties that are possessed by matter as such.

In short, the mere fact that the secondary qualities are not essential to matter as such does nothing to solve the problem with which they confront corpuscularian physics. And the existence of more than one basic kind of matter, though it implies that the conceptual repertoire of physics is not confined to properties that all matter has, does not doom the corpuscularian programme as such, but only one special form of it.[1] It is true that Locke was drawn to the latter: in several places where he says that bodies can interact only by pushing and bumping, he rejects 'attractive forces' because they could not be explained through the nature of matter as such. But he showed himself willing, under pressure from Newton, to drop that; and he did not think he was dropping the whole corpuscularian project.

I should add that Locke, unlike Descartes, did not see the commitment to primary qualities as coming from a deep requirement of intelligibility. He seems rather to have had a *faute de mieux* attitude to this, viewing primary-quality physics merely as the best game in town. This committed him to conceding that true final physics might be of some other kind, and he saw this. Secondary qualities , he wrote, depend upon the primary qualities of substances' minute and insensible parts, 'or if not upon them upon something yet more remote from our comprehension' (*Essay* IV.iii.11).

192. How the central thesis solves the problem

For the central thesis to solve the secondary-quality problem for corpuscularian physics, something must be added, namely:

> When a thing is disposed to have a certain effect on the sensory states of observers, it has this because of its structure, that is, because of the primary qualities and interrelations of its small parts.

Descartes says this when he identifies secondary qualities with 'certain dispositions depending on size, shape and motion'. (*Principles* 4:199.)

(The primary-quality underlay of redness (say) need not be the same for you as it is for me, nor even the same for you at one time as at another. We now know, as Locke could not have, that it is not the case that each colour supervenes on a single primary-quality texture of surface; the structural underlay of colour perception is not as tidy as that. Whether someone experiences red-type sensations depends on the wave-lengths of the light that impinges on him, and which wave-lengths are reflected from a given surface depend upon its 'texture'; so that if redness is to be strongly associated with surface texture it must be through those two dependences. It turns out that the former of them is more complicated than used to be thought. Although colour-sensations depend upon wave-lengths, there is no continuous range of wave-lengths correlated with a given colour. A scatter of mixtures of wave-lengths will lead a person to say he is seeing something red, another scatter for blue, and so on. This makes it unbelievable that there is a unitary kind of texture possessed by all the surfaces which are apt to cause R states in normal percipients in standard conditions. I here rely on Hardin.[2] In his important book

[1] McCann defends this against the view of Ayers that the 17th century mechanistic program essentially involved deriving the laws of physics from nothing but the attributes that all bodies must have. Edwin McCann, 'Lockean Mechanism', reprinted in V. Chappell (ed.), *The Cambridge Companion to Locke* (Cambridge University Press, 1998), at pp. 242-3; and M. R. Ayers, 'Mechanism, Superaddition, and the Proof of God's Existence in Locke's *Essay*', *Philosophical Review* 90, pp. 210–51.

[2] C. L. Hardin, *Color for Philosophers: Unweaving the Rainbow*, (Hackett, 1988).

Hardin rejects the central thesis because he sees so much difficulty in the notions of 'normal' percipients and viewing conditions (pp. 67–82). His own position is 'eliminativist' (p. 112); he holds that no objects are coloured.**)**

Why should anyone in the 17th century believe that colours supervene on micro-structures? Well, Descartes and his contemporaries could point to experiences with microscopes for evidence that a thing's surface appearance might supervene on microstructural features of it that do not appear in ordinary perception of the surface. Microscopes were in their infancy: their most important earlier pioneer, Antoni van Leeuwenhoek, was only 18 when Descartes died. But Descartes knew about them, was influenced by them in his thinking, and indeed thought about them. Hall writes: 'Descartes was virtually the founder of the scientific study of the apparatus of science, in his investigation of the causes of distortions present in the images of crude microscopes.'[1] Descartes certainly knew that small-scale structural differences can generate surface differences which do not appear to the unaided eye to be structural; and by Locke's time, everyone did.

That, however, is only a tiny step towards the whole thesis that the secondary qualities of things supervene on their microstructures. Some writers, including Mackie and Peter Alexander, have maintained that Locke at least could have been encouraged to go further by the successes that Galilean physics had been having. Others, including Margaret Wilson and myself, are unpersuaded by this: the relationship between sounds and wavelengths had been empirically established, but that is about all. The guess that things' colours supervene on their primary qualities was accompanied by a total lack of information about *how* this 'by virtue of' works: there was active debate, for instance, about whether a glass of claret reddens sunlight by altering it all or by absorbing some of it. Locke was candid about this: 'It [is] one thing to perceive and know the idea of white or black, and quite another to examine what kind of particles they must be, and how ranged in the superficies, to make any object appear white or black' (*Essay* II.viii.2).

Locke seems to have been sure that what explains those 'ideas' are *some* facts about micro-structures. Like other thinkers in the 17th century, he had grounds for believing that primary qualities afford the only credible prospect of a theoretically unified physics. So they could reasonably suppose that the causal explanations of our secondary-quality sensations involve primary-quality facts about the perceived object, the intervening medium, and the sense-organs and brain of the percipient. That leaves only the step from the events in the brain to the sensory states of the mind, and for Descartes at least that step does not belong to physics. The latter is the science of how bodies relate to other bodies, and the last step in the production of secondary-quality experiences involves the effects of bodies on an incorporeal substance. This is one of the places where Descartes's substance-dualism is helpful to him.

Locke was carefully agnostic about substance-dualism. For all he knew to the contrary, he said, our sensory experiences might be states of an animal body rather than of a separate substance. Still, he evinced no doubts about the soundness of property-dualism—the thesis that the properties things can have fall into two non-overlapping classes, the members of only one of them pertaining to mentality (§26). So he can envisage the causal chain from brain-events to mental ones as staying within the material world but running

[1] A. R. Hall, *The Scientific Revolution 1500–1800: The Formation of the Modern Scientific Attitude* (Longmans, 1954), p. 236.

from non-mentalistic properties to mentalistic ones, and he can calmly say that this relationship lies outside physics as he understands it. He can and he virtually does:

> Impressions made on the retina by rays of light, I think I understand; and motions from thence continued to the brain may be conceived, and that these produce ideas in our minds I am persuaded, but in a manner to me incomprehensible. This I can resolve only into the good pleasure of God, whose ways are past finding out. ('Examination of Malebranche', section 10)

In acknowledging this mystery about how body acts on mind, Locke does not lose his right to believe in the feasibility of a corpuscularian physics that comprehensively deals with (if substance-dualism is right) the world of bodies or (if it is wrong) with the non-mentalistic aspects of bodies.[1] 'Locke on Qualities', pp. 69–85.So he too can regard the truth of the central thesis about secondary qualities as a solution to the problem that they pose for his kind of physics.

The solution works also for contemporary materialists who identify sensory states with neural states, thus rejecting even property-dualism. All of us today belong in the Galilean camp. For them too, the fundamental scientific study of colours is a matter of finding out how bodies cause these states in percipients; their physics (in the broad sense) is obliged to carry the story through the whole way, but the sensory-neural equation on which their materialism is based clears the way for physics to carry out its obligation. The prospect of bringing colours within the purview of essentially Galilean physics opens up smoothly for a materialist, once it is clear that the project involves tracing causal chains from surfaces to light waves to neurons, and does not involve trying to reduce colours to primary qualities in a manner analogous to the reduction of solubility, frangibility and the like.

193. The 'no resemblance' thesis

In §188 I reported five things that Locke and others said about our distinction, and discussed four. The fifth says that our ideas of primary qualities do while those of secondary ones do not resemble the qualities that they represent. I have quoted Locke as saying this, and here is Descartes:

> Beliefs which I acquired not from nature but from a habit of making ill-considered judgments [include] the belief that. . . the heat in a body is something exactly resembling the idea of heat which is in me; or that when a body is white or green, the selfsame whiteness or greenness which I perceive through my senses is present in the body. (Meditation 6, CSM 2, pp. 56–7)

I agree that a body's secondary qualities do not resemble any of my sensations, but then nor do its primary qualities.

This thesis about secondary qualities, as well as being philosophically incoherent, also fails in the purpose of reconciling secondary qualities with Galilean physics. Someone wanting to advance the latter, and worried about how to bring the secondary qualities within its scope, will not be consoled by the news that his ideas of them do not resemble anything in the outer world. What help is that to him? He was worried not because he thought the secondary qualities resemble his ideas of them, but because he could not see how handle them in a Galilean physics.

We can explain why Descartes, Locke and others who accepted the central thesis, and saw that it solves their problem about secondary qualities, also sometimes slid into the 'no resemblance' account of them. As I remarked in

[1] For further defence of this, see Edwin McCann, 'Lockean Mechanism' (1985), reprinted in V. Chappell (ed.), *Locke* (Oxford University Press, 1980).

§157, we have almost no vocabulary in which to describe our 'sensations' or sensory 'ideas' except through what they represent. So although my 'ideas' do not have colours and shapes, it is true that I cannot say much about them except in terms of colours and shapes etc., saying things like 'It's the sort of sensory state people typically get into when they see something red' or '. . . when they feel something circular'. Someone who has noticed that, and who accepts the central thesis, can conclude: 'The adjectives that I need to characterize my sensory states fall into two groups: those that I do and those that I do not also need in doing physics. The former are the primary-quality ideas, the latter the secondary-quality ones.' So far, so good. It is an integral part of the correct solution that physics does not need secondary-quality concepts, once they have been explained. There is trouble only if the philosopher infers that his 'ideas' of primary qualities resemble outer things while his 'ideas' of secondary ones do not. That is an error, based on a misunderstanding of *how* primary- and secondary-quality words come into the description of 'ideas'. This treatment of the 'no resemblance' thesis is defended in my *Locke, Berkeley, Hume: Central Themes* (1971), p. 106; and has been adopted—'though on rather different grounds'—by Curley and Alexander.[1]

In our own century, some philosophers have flirted with the resemblance account of what is special about secondary qualities. Mackie writes:

> Locke means, surely, that material things literally have shapes as we see shapes, feel shapes, and think of shapes. . . Even under ideal conditions, when we are as right as it is possible to be about colours, colours as we see them are totally different not only from the powers to produce such colours, but also from the ground or basis of these powers in the things that we call coloured. (*op.cit.*, pp. 13–14)

This passage depends on 'shapes as we see shapes, feel shapes' etc. and 'colours as we see them'. Mackie does not even try to explain these phrases, and his uses of them are not reassuring. He identifies 'colours as we see them' with 'our ideas of secondary qualities', apparently implying that colours as we see them are mental. A page later, he contrasts shapes with colours by writing of something's 'literally being square, its having a shape-quality which we find in the experiential content to which the thing gives rise'. I can make no sense of this echo of the old idea that our sensations of shapes are shaped.

194. Is the central thesis a semantic one?

Here is Descartes stating the core of the central thesis:

> The properties in external objects to which we apply the terms 'light', 'colour', 'odour', 'flavour', 'sound', 'heat' and 'cold' are. . . simply various dispositions in these objects which make them able to set up various kinds of motion in our nerves which are required to produce all the various sensations in our soul. (*Principles of Philosophy* 4:198).

This is the kind of formulation that I have been using all along, but now I issue a warning with regard to it. It is all right to identify a colour (say) with a certain disposition if *all* one means by that is a tying of the truth of 'x is coloured' to 'x is disposed to. . . ', with the latter understood as the truth of a counterfactual conditional. The danger is that, having got that far, we may think there is a further question

[1] Edwin M. Curley, 'Locke, Boyle, and the Distinction Between Primary and Secondary Qualities', *Philosophical Review* 81 (1972), pp. 438–64; Peter Alexander, 'Boyle and Locke on Primary and Secondary Qualities', reprinted in Ian C. Tipton (ed.), *Locke on Human Understanding* (Oxford University Press, 1977), pp. 62–76.

about the ontological status of the disposition and thus of the colour. 'Granted: for a thing to have a certain disposition is for a counterfactual to be true. But what, metaphysically speaking, *is* the disposition?'

The most tempting answer is, we now know, wrong. 'The disposition is the primary-quality constellation upon which it supervenes'—wrong, because a single colour does not have a single primary-quality underlay. This is no problem for the central thesis, which is compatible with there being thousands of micro-textures any one of which would dispose a thing's surface to cause. . . etc.

A question to which there is at least one plainly wrong answer might seem at least to be a good question; but this one is not. Once you know the truth conditions for 'x has a disposition to. . . ', you know the whole story; there is no work to be done by the idle, empty, further question 'But what *is* a disposition?' In general, when philosophers italicize the copula, beware!

That question reflects the *noun fallacy*, the assumption that any properly used noun phrase must refer to some thing, some item with an ontological status. We know better. There is plainly a shortage of wheat in North Korea, but we do not inquire into the ontological status of shortages. We all understand that for there to be a shortage of wheat is for there to be less wheat than is needed, and that the latter formulation—in which the noun 'shortage' does not appear—is a better guide to the ontological commitments of this statement.

Yet the noun fallacy occurs quite often in philosophy. People confronted with a functionalist account of the truth conditions of 'In doing A, x intended to bring it about that P' ask whether the intention should be identified with a behavioural disposition, a neural structure, or what. No such question need arise. Again, a good account of the truth conditions of 'In uttering S, x means that P', rather than being obliged to answer the further question 'What kind of item is a meaning?', shows the question to be dispensable. Similarly, I contend, with dispositions. For a sugar cube to have a disposition to dissolve in water is for it to be such that if it were put in water and stirred it would dissolve. There is no place for any thing or item which is the disposition.

So in contexts where ontological questions loom, it may be wise to avoid such nouns as 'disposition', 'colour', 'redness' and the rest. Instead of equating noun phrases, we should equate fully sentential clauses. Here is Descartes doing exactly that:

> When we say that we perceive colours in objects, this is really just the same as saying that we perceive something in the objects whose nature we do not know, but which produces in us a certain very clear and vivid sensation which we call the sensation of colour. (*Principles of Philosophy* 1:70)

This tells us how to unpack complete sentences about things' colours. It equates *There is colour in the object* with *Something in the object disposes it to affect us thus and so*. Descartes includes 'we perceive', but that occurs on both sides of the equation, and cancels out.

Descartes here presents the central thesis as a semantic one; it tells us what statements about things' colours mean. If this were meant to generate definitions of 'coloured' or of specific colour-words, it would fail. Suppose we tried to explain the meaning of 'The object is blue' through something of the form 'The object is disposed to cause. . . a visual sensation of kind K'—what can 'K' stand for? If we put '. . . of the kind that people typically experience when they see something blue', the definition is circular. If instead we put '. . . of the kind that people typically experience when they see clear skies on a sunny day, an IBM logo, or. . . etc.', the

definition is wrong: it is not part of the meaning of 'blue' that any of those kinds of thing is typically blue. We just have to accept that when you typically see something blue, you have a visual state with whose intrinsic nature you are perfectly familiar but for which we have no descriptions other than in terms of what people experience when they see blue things. Descartes shows himself as sensitive to this when he explains colour-statements in terms of 'a certain very clear and vivid sensation which we call the sensation of colour'.

How can the central thesis be semantic without falling into the circularity trap? One way is to retreat into a definition that is confessedly only partial:

> To say that a thing is coloured is to say, in part, that it is disposed to cause [etc.] sensations of a certain kind.

But we can do better than that, thus:

> There is a kind K of sensation such that: to say that a thing is coloured is to say that it is disposed to cause [etc.] sensations of kind K.

This definition is also partial, because it contains a free variable which is bound from outside the definition. All that is needed for completion, however, is for the pupil—the person who is to learn from the definition—to know what kind K is; not the meaning of 'K', for it has none, but just the referent of it which makes the entire statement true. And the way to supply that is the one indicated by Locke—namely ostensive presentation of good examples. The quantified account says everything about the meaning of 'coloured' (or 'red', 'blue' etc.) that can be expressed verbally, and the rest of the semantic story must be supplied ostensively. Locke would agree with this; and I am not being unduly charitable in suggesting that it is what Descartes had in mind in his semantic statement of the central thesis.

Some philosophers have maintained that statements attributing colours, taken in their ordinary meanings, include a metaphysical commitment that conflicts with the central thesis. They seem to be crediting us with giving our colour-words meanings that have the resemblance thesis built into them. I see no evidence for this. Even if it is right, it is not interesting. If indeed we do all make that mistake, it does not connect significantly with anything else in our thought and talk; it squats there in our scheme of things, isolated, impotent, and boring. It would be easy to amend Descartes's semantic version of the central thesis so that it does not conflict with the alleged facts about this semantic error of ours. For example:

> When we apply 'red' to a thing, it would *be best* for us to mean only that it is disposed to cause. . . etc.

Or, a little more mildly:

> When we apply 'red' to a thing, all that *we need* to mean is that the thing is disposed to cause. . . etc.

Giving secondary-quality words that sort of meaning, we shall be able to cover all the facts that we now cover with their help.

Although those versions concern meanings, they are proposals or value judgments which are supported by contingent facts about the world as we find it. The semantic proposals are good ones because of how secondary qualities are nearly epiphenomenal.

Berkeley's uses of Locke's Work

From chapter 29 of *Learning from Six Philosophers*, (Oxford University Press, 2001), pp. 145–152.

[Sectiom 216 concerns abstract ideas. We start with:]

217. Berkeley on secondary qualities

Berkeley uses Locke's doctrine about secondary qualities as a stick with which to beat materialism.[1] This tactic depends entirely upon misunderstandings. Berkeley takes as canonical the worst one of Locke's various conflicting statements of the doctrine, namely that *secondary qualities are in the mind, primary qualities are outside it*, using this to fuel a battery of arguments contending that if secondary qualities are mental then primary ones must be also—which is immaterialism.

The best reading of these texts of Locke's is the 'central thesis' that each secondary quality is a thing's disposition to relate to minds in a certain way (§188). That does not put the secondary quality 'in the mind', and so it does not concede immaterialism for some qualities while denying it for others.[2] Let us look into what Berkeley does with his misunderstanding.

First, taking Locke to have said that material things have primary qualities but lack secondary ones, Berkeley objects that we cannot attach sense to the notion of a thing that has the former but not the latter.[3] He is evidently thinking of shape, size and movement on the one hand, and colour on the other, as detected by eyesight. But we also have the sense of touch, which informs us of primary qualities without giving a hint of secondary ones. Would not touch have to give information about texture? Yes, it would, but Locke regularly includes texture among the primary qualities (*Essay* II.xxiii.8, IV.iii.11,25), and Berkeley follows suit. Well, then, hard and soft? Perhaps—that is a complex business that I cannot go into here. When Hume took over this line of argument from Berkeley, he deepened and subtilized it, but could not free it of its commitment to sight at the expense of touch (*Treatise* 228-30).

Second, the case for putting secondary qualities 'in the mind', Berkeley thinks, comes from facts about relativity of perception: what colour a thing looks to have depends on the condition of the percipient and of the surroundings, and so on. He then argues that the same holds for primary qualities: for example, how fast a thing appears to be moving depends on the rate of 'the succession of ideas in the mind' of the percipient (*Principles* 11 and 14–15, and Dialogue 1 p. 190) In fact, Locke does not appeal to relativity of perception in support of his theory about secondary qualities, to which indeed it is irrelevant.

Third, the standard list of primary qualities includes 'number', and Berkeley contends that there is a special reason—not having to do with perception—why this must be 'in the mind'. This argument does not occur in the *Three*

[1] See *Principles of Human Knowledge* 10–11, 14–15, and *Three DIalogues*, first dialogue, pp. 187–194.

[2] For a fuller explanation, see my *Locke, Berkeley, Hume: Central Themes*, pp. 112–17. Berkeley's error about secondary qualities was pointed out by Reginald Jackson in his 1929 paper 'Locke's Distinction between Primary and Secondary Qualities', reprinted in C. B. Martin and D. M. Armstrong, (eds.), *Locke and Berkeley* (Doubleday, 1986), pp. 53–77. For a kinder view, supported by arguments which I respect but am not convinced by, see Margaret Wilson, 'History of Philosophy' etc., *op.cit.*, pp. 226–31.

[3] *Principles of Human Knowledge* 10; Dialogue 1, p. 194).

Dialogues but only here:

> That number is entirely the creature of the mind, even though the other qualities be allowed to exist without, will be evident to whoever considers that the same thing bears a different denomination of number as the mind views it with different respects. Thus, the same extension is one or three or thirty-six, according as the mind considers it with reference to a yard, a foot or an inch. (*Principles* 12)

Berkeley is working towards a point that Frege clearly articulated a century and a half later (1884). According to Frege, any statement applying a cardinality concept—any statement about *how many*—must involve some other general concept, and what is being said must concern the number of instances of that concept. One book, two hundred pages, thirty billion molecules—different numbers, but all applied to the same chunk of the world in relation to different concepts.

Frege's thesis concerns the logical form of a proper cardinality statement, not the state of mind of someone who utters it. The cardinality facts are perfectly objective and extramental (unless nothing is so); the ideas in the mind of the speaker are irrelevant. That destroys this point of Berkeley's, which owes any plausibility it has to being muddled with Frege's view. I should add that Frege's widely admired thesis, though plausible where Berkeley's is not, is also false. 'Cicero and Tully are one' is a good cardinality statement which does not count under a concept; 'Cicero and Caesar are two' is another.[1]

218. Berkeley on substratum substance

When he insists that materialism is conceptually flawed, Berkeley has two things in mind. One is his argument that we cannot conceive of matter because none of our ideas can resemble it. The other, which weighed with him equally, depends on another misunderstanding of Locke, specifically of his remarks about 'the idea of substance in general'. Berkeley's fumble with this deceived all his main commentators for many years, but in recent decades it has been clear to most writers in this area that the substratum doctrine is 'quite obviously' distinct from materialism.[2]

Berkeley runs together two lines of thought.

- In addition to our ideas, there is also, out there beyond the veil of perception, something called *matter* which our ideas are *of*. It is not known directly, or in itself, but we conjecture that it exists on the evidence of our ideas.
- In addition to quality-instances, there is also something called *substance*, which the qualities are *in*. It is not known directly, or in itself, but we conclude that it must exist because quality-instances could not exist without it.

These are as different as could be. The former is metaphysics, while the latter—at least in Locke's hands—comes from meaning-theory. The former has to do with subjective/objective, or inner/outer, while the latter concerns thing/quality. These two distinctions are at right angles to one another.

Berkeley, however, ran the two doctrines together, treating the attack on 'the idea of substance in general' as an attack on Lockean materialism:

> The sensible qualities are colour, figure, motion, smell, taste, and such like, that is, the ideas perceived by sense. Now for an idea to exist in an unperceiving thing is a manifest contradiction; for to have an idea

[1] For details, see W. P. Alston and Jonathan Bennett, 'Identity and Cardinality: Geach and Frege', *Philosophical Review* 93 (1984), pp. 553–67.

[2] Ian C. Tipton, *Berkeley: the Philosophy of Immaterialism* (Methuen 1974), p. 357, n. 15.

> is all one as to perceive. That therefore wherein colour, figure, and the like qualities exist must perceive them; hence it is clear there can be no unthinking substance or substratum of those ideas.[1]

Subsequent writers, right through into the 20th century, followed Berkeley in this muddle. For example, Warnock[2] reports Berkeley as rejecting Locke's 'second, shadowy world, alleged to lie somehow behind or beneath the things that we touch and see. . . '. The prepositions 'behind' and 'beneath' nicely reflect the conflation that I have been talking about. Another example comes from Ayer, doing philosophy in a non-historical way:

> We cannot, in our language, refer to the sensible properties of a thing without introducing a word or phrase which appears to stand for the thing itself as opposed to anything which may be said about it. [Some people wrongly think] that it is necessary to distinguish logically between the thing itself and any, or all, of its sensible properties. And so they employ the term 'substance' to refer to the thing itself. But from the fact that we happen to employ a single word to refer to a thing, and make that word the grammatical subject of the sentences in which we refer to the sensible appearances of the thing, it does not by any means follow that the thing itself is a 'simple entity', or that it cannot be defined in terms of the totality of its appearances. . . Logical analysis shows that what makes these 'appearances' the 'appearances of' the same thing is not their relationship to an entity other than themselves, but their relationship to one another.[3]

Ayer slides from 'the thing itself as opposed to anything which may be said about it' (substratum) to 'the thing itself [as opposed to] its appearances' (Lockean matter). The slide is greased by 'sensible properties', which echoes Berkeley's stock phrase 'sensible qualities'.

Berkeley writes as though 'Yes' to substratum substance stands or falls with 'Yes' to matter. But the answers he envisages—Yes-Yes and No-No—are only half of the possibilities. Here is No-Yes: the concept of substance is that of a suitably related bundle of tropes; and there is mind-independent matter. Here is Yes-No: our substance concept involves a sheer irreducible thing thought of some kind (no bundles); and Berkeleian immaterialism is true—there is no matter. So materialist metaphysics and idea-of-substance-in-general semantics are independent.

Berkeley perpetrated this conflation in a strikingly open way because he held as a matter of doctrine that *qualities are ideas*. This is indicated at the outset, in *Principles* 1, and it appears more openly in 7 and 91 and elsewhere. Berkeley carries this into his case for idealism; it is not merely something he carries out from it. Bad as this mistake is, we can see how Berkeley might come to make it. It might be influenced by the old view that sensory ideas are tropes, instances of the properties they represent. I am sure it is also encouraged by the isomorphisms that I discussed in §169 and, most potently, the one discussed in this section.

For Berkeley our confinement to our own ideas (we do not get behind the veil to the matter that causes them) is our confinement to the qualities of things (we do not get down to the substratum that has them). His thesis that real things are collections of ideas (we do not need matter) is his thesis

[1] *Principles* 7; see also 16–17, 73, and 77; and Dialogue 1, pp. 197–9.
[2] G. J. Warnock, *Berkeley* (Penguin, 1953), p. 110.
[3] A. J. Ayer, *Language, Truth and Logic*, 2nd edn. (Gollancz 1946), p. 42.

that a thing is a collection of properties (we do not need a substratum). Thus, he saw Locke's belief in an extramental world as tied to, standing or falling with, perhaps even being identical with, his belief in a substratum that supports a thing's qualities. Berkeley does not comment on the fact that Locke is cheerful in one of these and glumly reluctant in the other.

Locke himself, we have seen, tends to conflate ideas with tropes (§159); and I know of one place where that may have infected his handling of the substance issue in a more than merely verbal manner. This is the passage, discussed at the end of §207 above, where he writes that we 'suppose some substratum wherein [ideas] do subsist, and from which they do result, which therefore we call substance'. That uses 'ideas' to refer to tropes, but the conflation may also have influenced it in another way. The notion of a substratum substance as causing the tropes that it supports does not fit comfortably with most of what Locke writes on this topic; I suggested one explanation for it, and now I suggest another, namely that Locke has briefly slid into thinking of the 'ideas' partly as ideas properly so-called, sensory states or sense-data, and is thinking of the supposed substratum as the real extra-mental thing that causes them in our minds. Berkeley's mistake.

That is a conjectural explanation for one short atypical passage; it does not make Locke responsible for Berkeley's performance. Whereas Berkeley regularly runs the substratum issue together with the issue over materialism, Locke nearly always keeps them apart, sometimes explicitly showing how the substance concept cuts across the mental/material divide:

> Putting together the ideas of thinking and willing. . . , joined to substance of which we have no distinct idea, we have the idea of an immaterial spirit; and by putting together the ideas of coherent solid parts and a power of being moved, joined with substance of which likewise we have no positive idea, we have the idea of matter. . . Our idea of substance is equally obscure, or none at all, in both: It is but a supposed I know not what, to support those ideas we call accidents. (*Essay* II.xxiii.15. Notice the idea/quality slip-up in the last five words.)

I cannot explain Berkeley's thinking, in the light of this, that substratum and matter are essentially connected.[1]

As for the phrase 'material substance' (in the singular): Berkeley uses it about a dozen times in the *Principles*, suggesting that it captures something important in Locke's thought. But it is absent from Locke's *Essay*. Its plural occurs there once, and 'corporeal substances' oftener; but none of those passages concerns the so-called 'idea of substance in general'. In the only passage that uses 'corporeal substance' in the singular, Locke does use it stand for the troublesome substratum concept, but his point is that we use the concept when thinking about matter *just as we do when thinking about spirit* (II.xxiii.5,15). Every time he explicitly juxtaposes materiality with substance in general, he does so precisely in order to *deny* that the two are integrally connected. The more carefully one reads Locke, the less excusable does one find Berkeley's misunderstanding of him.

[1] George Pitcher in his *Berkeley* (Routledge 1977) at p. 121 gives the best defence I know for Berkeley's linking of substratum with matter, but it seems to me strained.

In a few places Berkeley attacks the substratum notion in itself, not as part of an attack on materialism. These passages point towards the real trouble with substratum, but they are not well focussed.[1] Berkeley mocks the word 'support' in the thesis that substances support their qualities. He does not remark that Locke also derides the suggestion that substances support qualities, likening it to the view that the world is supported by an elephant which is supported by a tortoise. 'Support' cannot be meant in its usual sense, Berkeley remarks, and no unusual one has been explained:

> Though you know not what it is, yet you must be supposed to know what relation it bears to accidents, and what is meant by its supporting them. It is evident support cannot here be taken in its usual or literal sense, as when we say that pillars support a building: in what sense therefore must it be taken?[2]

This is all right as far as it goes; but for Berkeley to get to the heart of the trouble he would need to understand that he is here confronted primarily by a thesis about what we mean in saying certain things; and he cannot do that while muddling this topic in semantics with the metaphysics of materialism.

Hume is innocent of Berkeley's conflation of the issue about substance with that about material things. Like many philosophers, he found problematic the thought of a single thing's lasting through a period of time (1) for some of which we do not perceive the thing, and/or (2) during which the thing alters. In *Treatise* I.iv.2 he addresses 1 purely in terms of material bodies and perceptions, and in iv.3 he tackles 2 in terms of substances and qualities. Hume does not allow either pair of concepts to leak over into the territory proper to the other.

[1] See *Principles* 16–17, first dialogue pp. 197–9.

[2] *Principles* 16; see also first dialogue p. 199)