HAL
open science

Qualities and sensory perception

Philippe Hamou

To cite this version:

Philippe Hamou. Qualities and sensory perception. Desmond Clarke and Catherine Wilson eds. The Oxford Handbook of Philosophy in Early-Modern Europe, Oxford University Press, pp.160-181, 2011, 10.1093/oxfordhb/9780199556137.003.0009 . halshs-00669841

HAL Id: halshs-00669841

https://shs.hal.science/halshs-00669841v1

Submitted on 22 Oct 2019

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Qualities and Sensory Perception

Philippe Hamou

Abstract and Keywords

This article describes the conception of sensory perception during the early modern period. It discusses David Hume's Treatise of Human Nature where he contrasted the ancient metaphysics of substantial forms and occult qualities with the metaphysics of the Moderns. The article argues that Hume was fundamentally correct and that the doctrine of secondary qualities is indeed a distinctively modern doctrine that captures something of the very essence of the new philosophical age.

sensory perception, early modern period, David Hume, Treatise of Human Nature, metaphysics, secondary qualities

In his *Treatise of Human Nature*, Hume contrasted the ancient metaphysics of substantial forms and occult qualities with the metaphysics of the Moderns, which he characterized as follows: ‘The fundamental principle of that philosophy is the opinion concerning colours, sounds, tastes, smells, heat and cold; which it asserts to be nothing but impressions in the mind, deriv'd from the operation of external objects, and without any resemblance to the qualities of the objects’ (Hume 1985: 275). Hume evidently had in mind the definition of secondary qualities that is given in Locke's *Essay*. Locke had distinguished two kinds of qualities that may be considered in bodies: (i) ‘*original* or *primary Qualities*’, that is, qualities ‘utterly inseparable from the Body’, such as ‘Solidity, Extension, Figure, Motion or Rest’; (ii) ‘*secondary Qualities*’, such as colours, sounds, or tastes, ‘which in truth are nothing in the Objects themselves, but Powers to produce various Sensations

in us by their *primary Qualities, i.e*. by the Bulk, Figure, Texture, and Motion of their insensible parts' (*Essay* II. viii. 9–10). Locke had also explained that, in contrast with ideas of primary qualities, the '*Ideas, produced* in us by these *Secondary Qualities, have no resemblance* of them (the qualities of bodies) at all' (*Essay* II. viii. 15). Although Hume's own appreciation of the doctrine is rather critical, it is striking that he describes it as the 'fundamental principle' of 'the modern philosophy'. I shall argue in what follows that Hume was fundamentally correct, and that the doctrine of secondary qualities is indeed a distinctively modern doctrine that captures something of the very essence of the new philosophical age.

Hume was not the only author of the eighteenth century who believed that 'modern philosophy' was deeply committed to the theory of secondary qualities. The opinion was implicit in many writings of the time, and especially in popular accounts of science and philosophy intended for ladies or for philosophically uneducated people. There is a telling example in a famous article by Joseph Addison, in the *Spectator*. There Addison invokes 'that great modern discovery… namely, that light and colours, as apprehended by the imagination, are only ideas in the mind, and not qualities that have any existence in matter.' Following this discovery, Addison invites his reader to meditate on the 'secret spell' that governs our lives:

> In short, our souls are at present delightfully lost and bewildered in a pleasing delusion and we walk about like the enchanted hero of a romance who sees beautiful castles, woods, and meadows, and at the same time hears the warbling of birds and the purling of streams; but upon the finishing of some secret spell the fantastic scene breaks up, and the disconsolate knight finds himself on a barren heath or in a solitary desert. (Addison 1712)

This image captures a distinctive feature of the modern mind. The modern philosopher, having recognized the spell of the senses, has to face the barren nature of the physical world. There is no longer room for the qualities that make human existence pleasing or beautiful. One may accept this with equanimity, as Addison seems to have done, and accept the fact that all the beauty of the world is a mere creation of the imagination. Alternatively, one may lament this new state of affairs and see in the doctrine of qualities the seeds of modern despair and scepticism. This was Berkeley's motive for rejecting modern philosophy in general and Locke's doctrine of secondary qualities in particular, and this line of thought is still well represented in our time.

I: Modern Qualities: the Philosophical Core

What then is the doctrine of qualities to which Hume and his contemporaries refer (for complaint or for praise) as the great principle of ‘modern philosophy’? Part of the answer is found in Locke's *Essay*, where the doctrine is stated in its full force and with the greatest detail. However, as we shall see, Locke's theory is in many respects more specific than the general doctrine it exemplifies and promotes. The core of the doctrine had been expressed in various philosophical contexts during the seventeenth century, long before Locke stamped the now received terminology of ‘primary and secondary qualities’.[1]

Many authors who defend one form or another of the doctrine rely on a strange piece of hypothesizing. Suppose that human beings and all other sensible beings were entirely annihilated. The question is then asked: what could still be said of the remaining material world, the bodies and corpuscles it comprises? Or what is it like for something (say a body, a material substance) to exist unperceived, without the mind? Does it make sense to say that it is solid and extended, red or green, warm or cold, where there are no eyes to see, no flesh to feel? The ‘modern’ answer is twofold: were all animals annihilated, insensitive corporeal things would continue to exist unperceived with *some sort* of qualities, such as extension, motion, or contexture of parts (the exact list is open to discussion), but there is also a set of ‘sensory’ qualities usually attributed to them, such as colours or tastes (this list is also open to discussion), that would simply vanish. As Locke says in the *Essay* (II. xxxi. 2): ‘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, though the Sun should continue just as it is now, and Mount *Aetna* flame higher than ever it did.’ A similar argument is found in Galileo: ‘if the living creature were removed, all these qualities would be removed and annihilated’ (E.N. VI, 347; Shea 1977: 100), and in Boyle: ‘if there were no Sensitive Beings those Bodies that are now the Objects of our Senses would be but dispositively, if I may so speak, endow'd with Colours, Tasts, and the like; and actually, but onely with those more Catholick Affections of Bodies, Figure, Motion, Texture, etc.’ (B: V, 319).

Whatever the subtle distinctions one may find between these quotations, Galileo, Boyle, and Locke share an assumption that the question they ask is both meaningful and answerable. Not only does it make sense to ask questions about ‘things unperceived’ (a point that Berkeley will deny[2]), but it is also possible to give a probable account of the intrinsic *qualities* of

such things, as they are *in themselves* (a point that Kant will deny (Allais 2008)). We may call this the *accessibility thesis*, although it might be said that it is no more or no less than crude ‘pre-critical’ metaphysical realism (cf. Meillassoux 2006: 13–38).

A second common assumption, of equal importance, is what may be called the *discrepancy thesis*. It says that things external to the mind do not resemble the way they are in the mind, when we perceive them or imagine them. When we perceive them, we tend to attribute to them qualities that exist only because the things are related to us or perceived by us, but these are not their intrinsic or real qualities. Such additional qualities are usually called ‘secondary qualities’ in Locke's idiom, but they may as well be called (as they are once in Locke's *Essay* II. viii. 22) ‘imputed qualities’. Things just *look like* such. As a consequence, there is a deep epistemological divide between two images of the world: one presents the world *as it looks*—the commonsensical world of ordinary experience, coloured, tasteful, and humanized; the other presents it *as it is*, that is, *sub specie aeternitatis*, in its pristine and inexorable existence. This latter is what we may call, borrowing Wilfrid Sellars' famous phrase, the early modern ‘scientific image’ (Sellars 1963: 19–20).

II: Cosmological Context

Before considering more closely these assumptions, and in order better to understand their true import and modernity, we shall focus a little more on the thought experiment from which they stem, namely: what would it be like for something material to exist in a world that is entirely devoid of living sensible habitants? Although it may seem a strange question to ask, the fascination it exerted on the Moderns is undeniable and understandable. The question captures in a somewhat radical fashion the metaphysical uneasiness that accompanied recent discoveries and speculations of natural philosophy. Microscopes and telescopes, those epoch-making instruments, had shown that there are many things in the world that had existed unperceived since the beginnings of humanity, and they also suggested that there were probably many more situated in the recesses of the universe, well beyond the capacity of our best instruments. These newly discovered (or speculated) ‘invisible worlds’ had a significant influence on the modern attitude toward nature (Wilson 1995; Hamou 1999–2001). They suggested that the whole Creation is not proportionate to, nor intended for, human existence, human perception, or human thought.

A similar insight arose from new cosmological speculations which considered infinite spaces (real or imaginary) situated beyond the scope of our senses, or infinite times (real or imaginary) displayed before or after the existence of mankind. Although a majority of philosophers in the seventeenth century still accepted as literally true the biblical chronology, which assigned a beginning and end not only to human existence but also to the material world created for men's use, there was a growing tendency to think that Creation would be better understood if we could extend its genetic development in a longer imaginary ancestral time. *La fable du monde*, the *cosmogenesis* described in Descartes' *Traité de la lumière*, is probably the best example of the way modern philosophers, who pretended to believe in the literal meaning of the seven days of Creation, indulged in such fictional narratives (AT XI 31–2; CSM I 90). This potential extension of space and time well beyond human or sensitive existence was an important sequel to the Copernican revolution. Although some Copernicans of the first generation, such as Kepler (KGW IV 309; Kepler 1965: 46), still held that the new position and movement of the Earth among its sister planets is best suited to realize man's destination as Contemplator of nature, this anthropocentric confidence faltered when it became apparent, by the mid-seventeenth century, that the system of the Sun had no cosmic privilege at all but was a very small, local, and peripheral part of the universe (Van Helden 1985).

These ideas also gained strength from their association with some features of the newly rediscovered Epicurean cosmology, which had a deep hold on the imagination of the Moderns, even on those who most vehemently objected to it (Wilson 2008). Among those Epicurean theses was the idea that the world, as we know it here and now, is the temporary result of a long process of atomic collisions and concatenations, which has already produced and destroyed many worlds before the first living being was even produced. Because of such considerations, it was easy to transmute the annihilation thought-experiment into other questions more clearly attuned to the scientific preoccupations of the time. How, for example, shall we describe the reality of a bare planet, revolving in a deserted part of the universe, much too far away for the best instrument to capture its image, or much too *ancestral* for any living creature to contemplate it? Or what sort of reality shall we attribute to the minutest parts of matter, which even the best microscope cannot access?

Of course the ‘new theory of qualities’ is not directly deducible from this cosmological context. The modern sensitivity to worlds beyond our perception only makes room for a doctrine that conjugates, in a rather

intricate manner, a new ontology and epistemology. The modern doctrine of qualities is an ontological doctrine, which deals with the very being or essence of material substances. It is also an epistemological doctrine about the way we get *access* to that intrinsic nature, and the reasons why we *usually mistake* that nature and impute to it qualities that do not exist.

III: Ontology

The term ‘quality’ still retains, for an early modern ear, some of its Aristotelian overtones. For Aristotle, quality is one of the ten categories, a mode of being. Aristotle defines it in general as that in virtue of which things, substances, people, are said to be such and such. Thus, the qualities are those inherent and more or less lasting features, habits, or dispositions of substances that specify them, and allow for such or such denomination and predication. More specifically, the qualities that Aristotle called ‘affective (or sensory) qualities’ are those features of a substance that allow such and such denomination, because of the way the senses are affected when the substance is presented to them. For example ‘Socrates is white’ means that there is in Socrates an intrinsic feature called ‘whiteness’ that makes us see Socrates as a white man. In short, a quality-name is, in the ancient doctrine, a term whose meaning captures something of the true, intrinsic nature of the thing, so that the particular that is qualified (e.g. Socrates' whiteness) can be considered as a true instantiation of the qualifying genus (the ‘form’: white), and may be legitimately called by its name, through what Aristotle called ‘paronymy’ (AR I, 3).

Part of this ontological description still makes sense for modern philosophers, for whom a quality is, generally speaking, the *cause* why something is qualified in such and such a manner. So it is legitimate to say that a substance, like porphyry, is red *because* it has certain intrinsic features that cause us to perceive it as red. Some Moderns would say that porphyry has ‘a rubrific property’ (Newton 1721: 108), or a ‘power’ to produce a perception of red (Locke *Essay* II. viii), or again a ‘disposition’ to appear red (Boyle B, V 319). An Aristotelian would have no qualms with these denominations: redness, in peripatetic philosophy, is certainly a *potentia*, a *rubrific* property: it makes people see red. However, for Aristotle, redness is more than that. It is a real quality that shares not only its name but also its essence with the form perceived; ‘red’ is an integral part of the real essence of a substance that is perceived as red. This real feature is embodied in porphyry and exists whether the porphyry is actually perceived or not. This is the point at which the ancients and moderns diverge.

In the modern theory of qualities, an affective or secondary quality receives its name *only* because of the causal relation between the sensible and the sentient. This process is ‘metonymic’; as Leibniz says, we name the cause after the effect (A VI/VI: 135), and there is room for equivocation here. In principle, cause and effect are distinct. There is no reason to assume, simply because of the causal relation, that there exists a likeness between a given quality and its perceptual effect or that the one should be a particular instance of the other. For example, although it is proper to say that porphyry is red, this does not necessarily mean that something, among the intrinsic features of porphyry, is an instance of ‘redness’ or a likeness of that sensation that I receive in my mind when I perceive red things. Most of the moderns think that there is something else (not ‘redness’, but some sort of texture or disposition of parts) in porphyry that causes us to perceive it as red and to name it accordingly. If so, redness is not a real quality, in the strictest Aristotelian sense of the term; it is, as Locke says, *only* a power to produce a perception of red or, as Galileo puts it, *only a name* for something in porphyry that is not red but which makes porphyry look red.

The moderns' critique of the peripatetic doctrine of ‘real qualities’ is well expressed by Malebranche when he says that the ancients failed to acknowledge that ‘their physics was nothing but a kind of logic’.

> It is clear to anyone who has read a little that practically all books of science…are full of argument based on elementary qualities and on secondary qualities such as attractive, retentive, concoctives, expulsives, and other such items, on other qualities they call occult, on specific virtues, and on several other entities men compose from the general idea of being and the idea of the cause of the effect they observe. …If these ordinary philosophers contented themselves with offering their physics simply as a logic that might furnish appropriate terms for discussing the things of nature…we would find no complaint in what they do. But they pretend to explain nature through their general and abstract terms, as if nature were abstract. (OCM III 458–9: MLO 242)

This was the same sort of error as occurred with the so-called ‘occult qualities’. Opium makes one sleep and, as a consequence, it may be said to have a ‘dormitive power’. The fire heats things, and so there must be something in fire (call it ‘heat’) that causes this effect. In general, from any sentence expressing a causal action, one may abstract a substantive predicate (a quality) that can be attributed to the subject.

But this is grammar (or logic), not physics. The peripatetic quality, as Malebranche says, ‘did not arouse other ideas in our minds than the ideas of being and cause in general’ (OCM III 458; MLO 242). In naming the quality we just describe the fact that there is something in the object that causes some effect (AT VIII-1 34; CSM I 218), but we do not thereby explain anything. ‘Heat’, ‘gravity’, ‘dormitive power’, or even ‘redness’ do not explain the actions of heating, weighing, inducing sleep, or making one see red; they merely name them. The mistake occurs when one substantiates the referents of these terms by considering them as real or formal entities.

Of course the critic of the ancient doctrine of qualities does not rely entirely on this alleged confusion between grammar and physics. After all, it *might* be the case that things such as ‘real qualities’ exist in matter, even though the mere fact that we have sensory impressions is not a good argument for that. So the disagreement between the Ancients and the Moderns is deeper. What is at stake is the general picture of the physical world that each accepts: what kind of physical entities should we reckon as making up the furniture of the world? What are those that really explain the behaviour of matter and, in particular, the fact that matter makes itself perceptible? For various reasons the Moderns do not think that the Aristotelian ‘real qualities’ are good candidates.

First, there are too many of them. One important argument invokes some version of Ockham's razor: one must not multiply entities without necessity. The ancients believe that there are as many real qualities, either manifest or occult, as we have names for the various effects of matter. But one should expect from a good explanatory principle that it allow for some degree of reduction, that it attributes a greater number of effects to a lesser number of causes—the fewer the causes, the better the explanation. In contrast, the ancients' real qualities are explanatory in a piecemeal and *ad hoc* manner. In particular, sensory qualities, such as colour, do not seem to have any function other than to explain why things should appear to us such and such (Smith 1990: 225), which is clearly anthropocentric. To a mind attuned to the new cosmological insights, it should not be the case that material things possess certain real intrinsic features whose unique *ratio essendi* is to make them perceptible to animal beings.

Although it had been commonly voiced among early modern philosophers, such criticism does not do justice to the Aristotelian doctrine of matter, which was strongly reductive. Some affective qualities, such as heat and cold, dry and moist, were considered as primary and essential, and were paired

in every material substance (AR 539). Other qualities (including colours) were, in various degrees, derivative, compound, and accidental (‘secondary’ in this sense). Besides, some qualities had an active causal power, while others were only passive. Thus when the moderns criticized the lack of explanatory power of real qualities, it was not solely on account of Ockam's razor, although they certainly considered their own doctrine of matter as simpler and more parsimonious. Their criticism aimed also at the nature of the explanation itself, at its very intelligibility.

Aristotelian physics requires that at least some affective qualities possess active powers, and that they be thus able to produce qualitative changes in matter through specific kinds of causation, such as assimilation or alteration, corruption or genesis. These types of changes are *sui generis* and irreducible. For example, sensory perception is considered in *De Anima* as a type of alteration; it affects the internal qualities of the sensing body and forces it to assume the form of the sensed body (AR 663, 674). For the Moderns this kind of causal action does not make sense any more. There is only one intelligible way to explain changes in matter, viz. through mechanical causality: bodies pushing or pulling other bodies, motion communicated through impulse and impact, and differentiated according to the variety of the shapes and quantity of matter. One explains a given change only when it has been reduced to such simple mechanical motions.

This mechanical reductionism is closely related to a new metaphysical conception of matter. Matter, the stuff which underlies all kinds of bodies, is no longer conceived as a pure indeterminate *substratum*, whose elusive existence is grasped only by abstracting it from the cluster of real qualities embodied in it. For a Modern, matter is an actual entity, fully determined, and possessed with ‘catholick affections’ such as shapes and movements. In consideration of those ‘primary’ qualities, matter is one and the same in all its manifestations. One may not be able to see this at the level of our ordinary experience, where bodies seem to belong to various classes according to the possession of some, apparently irreducible, qualities and powers. But a common assumption among the moderns is that these specific differences are all produced by the various arrangements and motions of a universal matter that is wholly undifferentiated.

This also explains why the new mechanical philosophy has to assume the form of a *corpuscular* philosophy (of which atomism is only one type, and not necessarily the most favoured one). If the variety of material substances depends only on the various arrangements and movements of its constitutive

parts, there must be some point in the division of a material substance where the specific properties produced by the texture or arrangement of parts will entirely disappear. At the sub-microscopic level of the ‘corpuscle’, there should be no more composition of parts to be considered: matter should appear fully homogeneous and possess only its truly ‘catholick’ affections. This is the significance of Locke's somewhat puzzling ‘division’ argument, when he explains that the primary qualities are those that a body constantly keeps, whatever the changes it undergoes through division of parts.

> For division (which is all that a Mill, or Pestel, or any other Body, does upon another, in reducing it to insensible parts) can never take away either Solidity, Extension, Figure, or Mobility from any Body, but only makes two, or more distinct separate masses of Matter, of that which was but one before… (*Essay* II. viii. 9)

This has often been represented (and criticized) as an empirical argument for the distinction of primary and secondary qualities, according to which invariance through division would be a criterion for primary qualities. That argument would be subject to the objection that, as long as the divided parts are still perceptible (or visible in a microscope), they retain *some* secondary qualities such as colours; when they are no longer visible, it begs the question to assert that those qualities would necessarily disappear. The fact that division cannot in principle affect the determinable spatial properties, such as the possession of shape or mobility, but somehow presupposes them, is irrelevant to the demonstration and cannot serve as a criterion for the distinction. However, Locke's point was not to provide a justification for primary qualities; he used the physical and mental division rather as an explanatory device to show what sort of thing a primary or inseparable quality is. What is implicit here is not so much a new physics, but its ontological underlying core: the conception of matter as a fully actualized being, completely undifferentiated at the corpuscular level. On this view, it is true that only the properties that can be ascribed to the constitutive undifferentiated parts of matter should be considered as utterly inseparable qualities of body in the most general sense of the term.[3]

The contrast, then, between the ancients and the moderns reflects a deep ontological disagreement concerning the furniture of the physical world, and the nature of what may count as explanatory entities for natural philosophy. For the ancients, sensory qualities are reckoned among the ingredients of material reality, deeply inscribed in its elemental nature, constitutive of its substantial form, and in some cases (such as heat and cold) causally

responsible for its activity. For the Moderns, they are nothing of the sort. They are attached to their subject, just as names are attached to the things named—that is, in virtue of an extrinsic relation to a living being who is endowed with sense and language. What truly exists in nature is a universal matter, whose constitutive parts (the corpuscles) are variously arranged and composed, but otherwise wholly undifferentiated, and which possesses the only qualities that the mechanical philosophy considers as requisite for an intelligible explanation of whatever appears in this world.

IV: Epistemology

The ontological distinction between real intrinsic features of the physical world and features that are only nominal and extrinsic has no immediate epistemological basis. In both cases quality-predication is imposed on us by the very *fact* of sensory perception: things appear to be coloured, just as they appear to be extended or solid. This fact is well expressed in Locke's conception of simple ideas as all equally positive, whatever the reality of their possible cause (*Essay* II. viii. 7). It seems natural to assume that the same sort of ontological and causal structure underlies both appearances. To justify the distinction, therefore, one needs to loosen the grip of sense and to make oneself, so to speak, blind, in order to see beyond the surface or to see ‘without the eyes’, if such a feat were ever possible.

The doctrine of a distinction of qualities was widely shared in the seventeenth century, by philosophers (such as Descartes) who considered that knowledge in general is gained through an ‘intellectual vision’, and by so-called empiricist philosophers (such as Gassendi and Locke), for whom all knowledge of corporeal things originates in sensory experience. Consequently, each of them required some sort of access to the distinction in question. This access might be (a) direct, if one can find, in the very experience we have of bodies, reasons to think that some qualities are primary and original; or it may be (b) indirect, through some sort of hypothetical reasoning and inference to the best explanation.

(a) The direct road to the distinction

One of the *direct* arguments is expressed in a famous page of Galileo's *Assayer* (1623), probably the first fully fledged statement of the modern doctrine of qualities:

> As soon as I think of a material object or a corporeal substance, I immediately feel the need to conceive

> simultaneously that it is bounded and has this or that shape, that it is big or small in relation to others, that it is in this or that place at a given time, that it moves or stays still, that it does or does not touch another body and that it is one, few or many. I cannot separate it from these conditions by any stretch of imagination. But my mind feels no compulsion to understand as necessary accompaniments that it should be white or red, bitter or sweet, noisy or silent, of sweet or of foul odour. For that reason, I think that tastes, odors, colors and so forth are no more than mere names, so far as pertains to the subject wherein they seem to reside, and that they only reside in the body that perceives them. Thus, if the living creature were removed, all these qualities would be removed and annihilated. (E.N. VI, 347; Shea 1977: 100)

The distinction is presented here, in a first-person narrative, as the result of a pure thought-experiment. The question is not about existing, sensible corporeal substances, but about constraints and strictures of consciousness. It asks: what is going on in *my* mind when I think of a 'body'? It appears that, on the one hand, there is a mental necessity or compulsion to link the concept of body with other concepts, such as shape or motion and rest; on the other hand, when one comes to other determinable qualities such as colour or taste, no such need is felt. The mental link between the concept of body and these latter sensory qualities is experienced as contingent. For example, it is possible to think of a tasteless or colourless body, but not of a body without shape. The mental process involved in this experience of separability or inseparability is a sort of abstraction. Through this mental process, it seems that I can detach the concept of body from some conditions or circumstances of its familiar existence, but not from others, and I conclude that the detachable conditions would never be attributed to the body if I were not endowed with corporeal senses.

The argument is puzzling. The necessity Galileo tries to capture through the mental experience is not merely analytical. The essential features of bodies cannot be essential simply because they are included in a nominal or conventional definition of bodies. They are supposed to be inseparable in *res* and not only in *words*, and this suggests a number of possible objections. Berkeley identified one of them when he contended that the modern distinction between primary and secondary qualities relies on an undue confidence in the abstracting powers of the mind (BW II 45). Is it really possible to think of an extended body without giving it a colour? It seems

clear that one cannot think of a colour without giving it an extension, and so one still has to explain why and in what sense the extended colour does not pertain to the body, whereas the uncoloured extension does.

Another problem is how far this method of mental analysis should be considered as capable of securing an exhaustive list of primary or essential qualities. Shall we say that what holds true for extension, number, or shape, holds true as well for solidity, cohesion, or gravity? Or shall we count these latter qualities among the ones that would simply vanish when unperceived? One may therefore wonder whether it is impossible to consider at least some of those other qualities as ‘secondary’ in an Aristotelian (not Lockean) sense, that is, as *real qualities* resulting from certain combinations or interactions of primary qualities. But once this possibility is admitted, it seems that there is nothing in our mental experience to prevent us from drawing the same conclusion about other sensory qualities, such as colours, and treating them as *real* secondary qualities, rather than illusory ones. Last, but not least: Galileo doesn't even try to explain or justify why a conceptual necessity, captured through a purely mental process, should describe adequately the world as it is. Such a justification would require much more metaphysical or epistemological theorizing than Galileo was willing to provide.

Descartes, another proponent of *the direct method*, was more alive to the metaphysical underpinnings of the doctrine. In the *Meditations* he argued that, provided that one succeeds in leading the mind away from the senses, it is possible to access a purely intellectual mode of thinking, which provides clear and distinct ideas. Since God exists and does not deceive, such ideas must be considered as representing truly their objects; otherwise our very nature would be deceitful. Extension, the object of geometry, is one of these purely intellectual ideas, and it is the only idea of this sort that we have when we try to get a pure intellectual conception of the external material substance. Thus, the essence of matter appears to the mind as pure quantity diffused in length, breadth, and depth. In contrast, ideas of the sense do not show the intrinsic possibility of what they exhibit and they include a ‘material falsity’, a structural defect that gives occasion to false judgements (AT VII 43; CSM II 30).

However, the distinction drawn in the *Meditations* between the clear and distinct ideas of extension and its modes on the one hand, and the confused and obscure ideas of sense on the other, is not identical with the distinction of primary and secondary qualities. We have sensory (confused) ideas of determinate extensions, shapes, and movements that can be as deceitful

as our ideas of sounds, colours, or tactile qualities. Thus the argument that focuses on the fact that our senses are not the source of our knowledge of bodies but are, at the very best, an occasion for it, does not directly address the distinction between real and imputed qualities. However, it serves as an important basis for a direct argument that is found rather inconspicuously in the *Principles*.

> If, whenever our hands moved in a given 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. And since it is quite unintelligible to suppose that, if bodies did move away in this fashion, they would thereby lose their bodily nature, it follows that this nature cannot consist in hardness. By the same reasoning it can be shown that weight, colour, and all other such qualities that are perceived by the senses as being in corporeal matter, can be removed from it, while the matter itself remains intact; it thus follows that its nature does not depend on any of these qualities. (AT VIII-1 42; CSM I 224)

The argument is similar to the one Galileo had devised in the *Assayer*: in both cases a thought experiment serves as a test for the mental separability or inseparability of qualities. But here the distinction of qualities is the result of an *active* (although purely mental) process in which we consider the partly confused ideas that we have of particular bodies and, so to speak, put them mentally to a test. We submit the particular body, invested with its various apparent qualities, to some imaginary actions, such as moving it or moving with it, dividing it, etc. These actions, whose effects are mentally anticipated through what Gareth Evans has aptly called ‘a natively given primitive mechanics’ (Evans 1996: 271), allow us to grasp what is really inseparable from bodies (e.g. spatial properties, aptness to move) and what is not (e.g. hardness).

Besides, the Cartesian version of the thought experiment can stand on a firmer metaphysical basis. To this end the *Meditations* had provided at least three important elements: (i) the very possibility of a pure intellectual consideration of bodies has been secured through radical doubt; even though we do not have any body or organs to sense material things, we might still be able to know them. This is a sophisticated version of the animal-annihilation hypothesis. ‘I shall consider myself as not having hands or eyes, or flesh or blood or senses, but as falsely believing that I have all these things’ (AT VII 23; CSM II 15); (ii) God's veracity allows us to adopt

the rule that whatever is clearly and distinctly conceived of something may be said truly of that thing. This implies that whatever is conceived clearly and distinctly as belonging to a particular body either exists, or at least *can* exist as a genuine intrinsic property of that body; (iii) finally, the doctrine of confused ideas and of material falsity is important at least negatively, in that it shows why, whenever the question of the essence of matter is at stake, we must not rely on the ideas of sense, which are apt to represent to us what is not as if it were something.

(b) The direct road: empiricist strategies, and empiricist critics

In the *Essay* (II. viii), Locke mentioned a number of facts which have often been considered as ‘empirical motives’ for adopting the distinction between real and imputed qualities. For example, the same flame at different distances produces in us sensations of warmth or pain (§16); the same water is cold to one hand and hot to another (§21); porphyry ceases to appear red and white whenever light is prevented from striking on it (§19); an almond changes its colour and taste when it is reduced to powder (§20). Several other similar facts (including facts about diseases that affect our perception of tastes or colours) are mentioned in the early modern literature on qualities. They suggest that there are some qualities that can be altered radically and even converted into their contrary (such as hot and cold), or affected with contrary existential value (such as agreeable and painful) on account of a mere circumstantial change, such as the location of the sensible object in relation to the percipient, the internal disposition of the sensitive body, the illumination of the object, or its state of division.

These changes are circumstantial because, whereas they affect significantly our sensory ideas, they cannot (with the possible exception of the ground almond) be reasonably thought of as affecting the internal structure of the body in question, which, to all appearances, remains the same. It is not only that the same object appears under different perspectives at different times, or to different persons—since perspectival relativity applies first and foremost to primary qualities, it cannot function as a possible criterion; it also causes us to attribute incompatible properties to the body. This strong relativity would be understandable if the ideas of those qualities were not instantiations of ‘real qualities’ possessed by the bodies themselves but rather (as is commonly thought of pain) if they were only effects of the bodies on our sensory organs, with no resemblance whatsoever with their cause.

However, it is not enough to show that at least some secondary qualities in given couples of contraries (such as hot and cold, sweet and sour) are necessarily without an archetype (external resemblance) and as such are purely mental; one has also to understand that it is a common feature of both contraries and of all secondary qualities whatsoever. Since we know that any sensation may be without an archetype, and since there is no phenomenal feature in sensations themselves that may justify us in saying, for example, that warmth is more real than cold, both may proceed from the same sort of cause: what has appeared *necessarily* true of the one should also be true of the other.

If thus construed, the empiricist argument about secondary qualities does not prove what it is supposed to prove. Or rather, it proves too much. On empiricist standards, such as the ones Berkeley thought he shared with Locke, we do not have any idea of an extended body except through the sensory ideas (or impressions) that we have of its minimal parts of coloured extension or tangible (solid) extension. So if the demonstration quoted above were both empirically grounded and valid, it must apply not only to colour or other secondary qualities considered *in abstracto*, but also to whatever cannot be thought of *but as coloured or tangible*, that is, to the very primary properties that the modern doctrine of qualities considered as existing independently of us. Hume summarized the unavoidable conclusion: ‘instead of explaining the operation of external objects by its [the doctrine of qualities] means, we utterly annihilate all these objects, and reduce ourselves to the opinions of the most extravagant skepticism concerning them’ (Hume 1985: 277). The very argument adduced to prove the modern theory of qualities leads us to conclusions that are directly opposite to the convictions the doctrine was supposed to express and ground: the external reality of primary qualities and the modern scientific image.

In summary, the direct road has proved a difficult one. In both forms (as a result of a thought experiment, or as a conclusion from empirical facts about our sensations), it reveals severe weaknesses. One may conclude that it was probably not because of such arguments that the modern mind found the theory of qualities so convincing.

(c) The indirect road: sense-perception and mechanism

Although the standard interpretation of Locke construes his discussion as providing empirical arguments for the distinction of qualities, there is a growing consensus among scholars in favour of an alternative reading

(Mandelbaum 1964; Curley 1972; Alexander 1985). The *Essay* is now generally read against the background of Boyle's mechanical and corpuscular hypothesis, and the putative empirical arguments outlined above are now considered rather as ‘clarifying examples of the power of corpuscularian explanations’ (Wilson 1992: 220). That hypothesis explains why it may be possible for the same water to appear hot to one hand and cold to another because of the mechanical interactions, at the corpuscular level, between external bodies and the senses.

Locke himself had presented his discussion of qualities as a digression into physical considerations, whose aim was to make the reader understand the nature of sensation and the important distinction between ideas and qualities (*Essay* II. viii. 22). This digression shows how, according to the corpuscular hypothesis, ideas (of the senses) are produced in the mind through the action of external objects. According to the mechanical philosophy, action through contact and impulse is the only intelligible way bodies can be conceived to operate one upon the other (*Essay* II. viii. 11). Whenever it seems that such contact is missing, one has to postulate some invisible threads, corpuscles, or effluvia that connect the cause and the effects. In the case of vision (in which sensory perception seems to occur at a distance), this contact action is effected by light, whose corpuscles, variously reflected by the surface structures of the bodies, affect the retina with various motions and forces. This affection can then be propagated to the brain, either through vibrations of an internal fluid or by direct impulse, and can contribute to form there some sort of image or, in Newton's language, a ‘motional picture’ (Newton 1959–97, II: Letter 264). The mental counterpart of this process takes place at the very end of it, when cerebral motions or pictures, acting, so to speak, directly ‘against’ the soul, cause the mind to have various ‘ideas’ or ‘sentiments’.

Such description of the mechanism of sensory perception owes much to the theories of visual perception devised in the first half of the century in the optical works of Kepler and Descartes. Kepler, through geometrical analysis and insights from contemporary anatomists (such as Felix Plater or Fabrizio d'Aquapendente) discovered that the eye functions as a ‘camera obscura’: the crystalline is a lens, refracting the rays of light, and the retina is a screen, receiving a two dimensional picture of the external visual hemisphere (KGW II: 151; Crombie 1964: 147). Unlike the ‘sensible species’ of the ancient theories, this *pictura* is not some sort of specular image of the external hemisphere, floating as it were in the transparent parts of the eye, and then transmitted through the supposedly hollow canal of the optic nerve to the

inner cells of the ‘ultimate sentient’. Recent anatomical observations had shown that there was no canal of any sort inside the optic nerve that would allow for such transmission. Rather, the retinal picture is a ‘penetrating affection’, which affects the ‘animal spirits’[4] filling the optic nerve in a fully physical way, described in Kepler's *Dioptrics* as a kind of combustion (KGW IV 372). Such analysis made clear that the image produced in the eye, to which our conscious vision is congruent, is, in many ways, distinct from the external object producing it. One important difference is the fact that one dimension is lost: the picture is a perspective image projected on a curved surface, and as such submitted to a number of geometrical distortions. However, this discrepancy is no obstacle to representation. As Descartes will say: ‘the perfection of an image often depends on its not resembling its object as much as it might’ (AT VII 113; CSM I 165). Thus, just as in perspective painting, the retinal picture provides the judgement with indirect signs for tri-dimensional visual properties. Such analysis reveals that the eye is no longer a mere receptor of the form of the sensible; it plays an active role in reshaping the information transmitted by the rays of light, disfiguring it or rather encoding it, so that the input from the external world is converted into something that can adequately move the material spirits circulating in the nerve connecting the retina to the brain, and there properly affect the seat of sensation.

It is possible that Kepler was not himself fully conscious of the conceptual change involved in his new theory of vision, but Descartes, who extensively drew on Kepler's descriptions, definitely was. According to Descartes' *Dioptrics*, sensory perception does not require that any resemblances or ‘*images voltigeantes*’ issue from things and then pass through the organs of vision to the seat of sensation. All that is required is that some movement or pressure be communicated to the organ and appropriately transmitted to the brain, where it gives ‘occasion’ to the mind to have various ideas. In such a theory, there is no reason why the (mental) effect should resemble the (physical) cause. One has only to suppose, in accordance with the doctrine of mind–body union, that the motion in the brain is constituted by nature in such a way that it regularly produces the mental effect: ‘It can also be proved that the nature of our mind is such that the mere occurrence of certain motions in the body can stimulate it to have all manner of thoughts which have no likeness to the movements in question. This is especially true of the confused thoughts we call sensations or feelings’ (AT VIII-1 320; CSM 1 284). Thus, the relation between cerebral movements and sensory ideas is a causal relation, not a cognitive one. Its *nomological* structure is the result of an arbitrary (although natural) institution connecting a mind to a body.

Without such an institution, the soul, by its own nature, would not be able to react to the motions produced in the brain to which it is present, any more than it is actually able to read similar motions in other brains, or directly in the external world.

We are now in position to formulate the indirect argument for the new theory of qualities. It stands on two connected grounds. On the one hand, there is the causal analysis of sensory perception that we have just outlined. The organs of sense are not neutral receptacles of the sensible form, but rather mechanical devices whose function is to transmit corpuscular motions from the outer world and convert them into physiological events and cerebral configurations, to which the soul reacts in a constrained manner. Thus, the mere fact that we have sensory experiences is no longer a good reason for endowing objects with secondary qualities that resemble them. The only conclusion to which we are entitled is that the external bodies possess some (causal) powers or dispositions to produce certain ideas in us.[5]

On the other hand there is the superior heuristic value of the mechanical hypothesis, its explanatory success and promise. Reducing matter to its mechanical (or primary) properties alone will allow us to satisfy the need for a pervasive explanatory principle in physics, a principle that is both simpler and more intelligible than the real qualities of the Ancients. It will also offer side-benefits, of no slight import, such as the one mentioned by Malebranche in the *Search after Truth*: if we suppose that there exist in matter other intrinsic qualities of which we know nothing, then how shall we answer libertines and atheists who argue that the matter of the brain can think in virtue of some unknown power (OCM III 466; MLO 246).

So goes the indirect argument: the modern scientific image and its new ontology of qualities will provide us with the best explanation of the physical world; and sensory experience no longer provides any objection to this image. On the contrary, the causal process involved in sensation is an almost ordinary instance of mechanical action through local contact and ‘impulse’, and its final result, the mental effect, no longer belongs to the physical realm.

The hypothetical or indirect road towards the modern theory of qualities appears to have been the one most trodden in early modern philosophy. Even philosophers who devised *a priori* arguments for the distinction appear to have done it in order to give a metaphysical basis to a conviction that was first framed by considering the superior heuristic value of the mechanical hypothesis. This is especially apparent in Descartes' early physics, in texts

such as the *Treatise of the World* and the *Treatise of Man*, which make extensive use of a hypothetical method (the ‘fable’). There Descartes asserts that, in a hypothetical world of matter conceived as pure quantity, consisting of extended parts of various shapes and sizes, subject to a small number of basic mechanical laws, any effect that is ordinarily attributed to the so-called real qualities of bodies, either occult or manifest, active or passive, can be intelligibly produced and explained (AT IX 25–6; CSM I 89). In the *Treatise of Man* in particular, one can see that the whole range of known animal reactions and behaviours may be explained if the organs of sense are mechanically affected by matter in its various arrangements and motions in as many ways as there are secondary qualities that affect us differently.

(d) The false imputation of the sense

One last question is in order: how can the false imputation of the senses be explained, justified, and accounted for within the general scheme of God's Providence, to which most philosophers in the early modern period were still so deeply attached?

At the end of Part I of the *Principles*, Descartes offers a plausible psycho-genetic explanation of why we falsely attribute to things sensations that do not accurately represent anything in them.

> It is here that the first and main cause of all our errors may be recognized. In our early childhood the mind was so closely tied to the body that it had no leisure for any thoughts except those by means of which it had sensory awareness of what was happening to the body. It did not refer these thoughts to anything outside itself, but merely felt pain when something harmful was happening to the body and felt pleasure when something beneficial occurred. And when nothing very beneficial or harmful was happening to the body, the mind had various sensations corresponding to the different areas where, and ways in which, the body was being stimulated…sensations which do not represent anything located outside our thought. At the same time the mind perceived sizes, shapes, motions and so on, which were presented to it not as sensations but as things, or modes of things, existing (or at least capable of existing) outside thought, although it was not yet aware of the difference between things and sensations. The next stage arose when the mechanism of the body…twisted around aimlessly in all directions in its random attempts to pursue

> the beneficial and avoid the harmful; at this point the mind that was attached to the body began to notice that the objects of this pursuit or avoidance had an existence outside itself. And it attributed to them not only sizes, shapes, motions and the like, which it perceived as things or modes of things, but also tastes, smells and so on, the sensations of which were, it realized, produced by the objects in question. (AT VIII-1 35–6; CSM I 218–19)

Descartes here proposes an empirical description of the way we acquired our ideas (and prejudices) about the external world. The false imputation of secondary qualities is said to result from the very order in which ideas are acquired—an order that is imposed on us by the biological fact that we were infants before becoming adults. Prejudices are acquired in childhood, because the mind is too tied to the body; they are maintained through a consequent lack of right (pure) reasoning and by the effect of natural processes, such as the association of ideas. So error is almost unavoidable. It is inscribed in the very process of men's maturation. How shall we evaluate this fact? On the one hand, its frequent denunciation by modern philosophers is justifiable. Obscure ideas, however acquired, should never be considered as reliable grounds for judgement and, for that reason, men are genuinely accountable for the false imputation of secondary qualities. Whatever the incorrigibility of our error, God's veracity is not really at stake.

On the other hand, for Descartes as for many of his successors, the ‘error’ of the senses, because it is natural, must be understood in a providential setting. According to the genetic description, sensory qualities are usually related to objects that may affect our bodies with either beneficial or harmful effects. One is naturally led therefore to use them to acknowledge, and take advantage of, these biologically prominent features of the external world. One may go even further in evaluating this functional status of the senses, following a line of argument developed by Arnauld in *On True and False Ideas*. By allowing us to distinguish things according to qualitative differences that are easy to recognize, such as differences of colour, our senses as currently constituted are indeed much more efficient than they would be if they gave us direct access to the corpuscular correlates of our sensations in the physical world—that is, to subtle differences in quantity of motion, arrangement, or shapes. Our soul ‘would find it too difficult to discern the difference in these stimulations, which is only one of degree’ (Arnauld 1990: 132). It has been argued (Beyssade 2001: 165–73) that, in this new perspective, secondary qualities are no longer what

hinders our perception of primary ones; instead, they constitute a most useful key for interpreting them. Arnauld compares secondary qualities to the ‘rough pattern’ used in tapestry-work in order to avoid error in the composition of what are often very slightly differing shades: ‘just as tapestry workers have a pattern, which they call a “rough pattern”, where the various shades of the same colour are indicated by completely different colours, so that they are less liable to mistake them’ (Arnauld 1990: 132). On this characterization, the ontological predication itself is perhaps no longer at fault: ‘Thus it was due to our making language match the intentions of the Author of Nature that we call bodies white, black, or putrid…the intention of the Author of Nature is that our soul attach colours to them (objects) and apply them to bodies in some way, in order to distinguish between them more easily’ (Arnauld 1990: 174–5).

Malebranche on the one hand, and Locke and Berkeley on the other, expressed similar ideas: they also thought that the organization of sense perception (not only the sensory qualities, but also the natural judgements we tend to make while perceiving) constitute an important argument in favour of the providential disposition of things. Malebranche added a religious dimension to the argument. God provides secondary qualities (and the spontaneous natural judgements that result) in order to alleviate the burden of the human mind, so that it can devote itself to its proper objects of contemplation, the spiritual goods (OCM XII 98–9).

For Locke, ideas of sense are exactly correlated to powers in things, and serve as ‘distinguishing characters’ enabling us to know them. In consequence all simple ideas, including ideas of secondary qualities, can be said to be real and adequate, despite the fact that they do not all resemble their objects:

> For these several Appearances, being designed to be the Marks, whereby we are to know, and distinguish Things, which we have to do with; our *Ideas* do as well serve us to that purpose, and are as real distinguishing Characters, whether they be only constant Effects, or else exact Resemblances of something in the things themselves: the reality lying in that steady correspondence, they have with the distinct Constitutions of real Beings. But whether they answer to those Constitutions, as to Causes, or Patterns, it matters not; it suffices, that they are constantly produced by them. (*Essay* II. xxx. 2)

Berkeley will draw on this, pushing the Lockean argument to its extreme: the sensory qualities are not only provided by God as tools for deciphering the world; they are the very language with which God chose to address us, designed for directing us in our lives and our knowledge (BW I 231). The agreement of our sensory ideas with the inner constitution of a putative external material substance is no longer relevant. The world of sensory qualities is the only world in which we live; there is no other to be looked for. Once again the theory of qualities seems, by its own virtue, to revert to its contrary.

References

Addison, J. (1712). *Spectator*, 413, 24 June 1712.
Find This Resource

Alexander, P. (1985). *Ideas, Qualities and Corpuscles: Locke and Boyle on the External World*. Cambridge: Cambridge University Press.
Find This Resource

Allais, L. (2007). ‘Kant idealism and the secondary quality analogy’. *Journal of the History of Ideas*, 45: 459–84.
Find This Resource

Anstey, P. M. (2000). *The Philosophy of Robert Boyle*. London and New York: Routledge.
Find This Resource

Arnauld, A. (1990). *On True and False Ideas*. Trans. S. Gaukroger. Manchester and New York: Manchester University Press.
Find This Resource

Beyssade, J.-M. (2001). ‘Sensation et Idées: le patron rude de Descartes à Arnauld’, in *Etudes sur Descartes. L'histoire d'un esprit*. Paris: Editions du Seuil.
Find This Resource

Crombie, A. C. (1964). ‘Kepler: De Modo Visionis. A translation from the Latin of *Ad Vitellionem Paralipomena*, V, 2, and related passages on the formation of the retinal image’, in *L'Aventure de la Science, Mélanges Alexandre Koyré*. Paris: Hermann.
Find This Resource

Curley, E. M. (1972). ‘Locke, Boyle and the distinction between primary and secondary qualities’. *The Philosophical Review*, 81: 438–64.
Find This Resource

De Calan, R. (2008). *Généalogie de la Sensation Physique, physiologie et Psychologie en Europe, de Fernel à Locke*. Thèse de doctorat de Philosophie, Ecole Normale Supérieure LSH, Lyon.
Find This Resource

Evans, G. (1996). ‘Things without the Mind’, in *Collected Papers*. Oxford: Oxford University Press.
Find This Resource

Hamou, P. (1999–2001). *La Mutation du visible, essai sur la portée épistémologique des instruments d'optique au XVIIe siècle*. 2 vols. Villeneuve d'Ascq: Presses Universitaires du Septentrion.
Find This Resource

Hume, D. (1985). *A Treatise of Human Nature*. Ed. E. C. Mossner. London: Penguin Classics.
Find This Resource

Kepler (1965). *Kepler's Conversation with Galileo's Sidereal Messenger*. Trans. Edward Rosen. The Sources of Science, No. 5. New York: Johnson Reprint Corp.
Find This Resource

Malebranche, N. (1979). *Oeuvres I*. Ed. G. Rodis-Lewis. Bibliothèque de la Pléiade. Paris: Gallimard.
Find This Resource

Mandelbaum, M. (1964). *Philosophy, Science and Sense-Perception: Historical and Critical Studies*. Baltimore: Johns Hopkins University Press.
Find This Resource

Meillassoux, Q. (2006). *Après la finitude. Essai sur la nécessité de la contingence*. Paris: Editions du Seuil.
Find This Resource

Newton, I. (1721). *Opticks, or A Treatise of the Reflections, Refractions, Inflections & Colours of Light*. 3rd edn. London.
Find This Resource

Newton, I. (1959–77). *The Correspondence of Isaac Newton*. Ed. H. J. Turnbull. 7 vols. Cambridge: Cambridge University Press.
Find This Resource

Sellars, W. (1963). *Science, Perception and Reality*. London: Routledge & Kegan Paul.
Find This Resource

Shea, W. (1977). *Galileo's Intellectual Revolution. Middle Period: 1610–1632*. New York: Science History Publications.
Find This Resource

Simmons, A. (2003). ‘Descartes on the cognitive structure of sensory experience’. *Philosophy and Phenomenological Research*, 67: 549–79.
Find This Resource

Smith, A. D. (1990). ‘Of primary and secondary qualities’. *The Philosophical Review*, 99: 221–54.
Find This Resource

Van Helden, A. (1985). *Measuring the Universe: Cosmic Dimensions from Aristarchus to Halley*. Chicago: The Chicago University Press.
Find This Resource

Wilson, C. (1995). *The Invisible World: Early Modern Philosophy and the Invention of the Microscope*. Princeton, NJ: Princeton University Press.
Find This Resource

Wilson, C. (2008). *Epicureanism at the Origins of Modernity*. Oxford: Oxford University Press.
Find This Resource

Wilson, M. D. (1992). ‘History of philosophy in philosophy today; and the case of the sensible qualities’. *The Philosophical Review*, 101: 191–243.
Find This Resource

Notes:

(1) The expression ‘secondary quality’ is very rare in Boyle (Anstey 2000: 39), and is not used in Locke's meaning. The same holds for Malebranche. Both authors still use the phrase ‘secondary qualities’ in a rather traditional manner to signify compound qualities that are constructed out of ‘elementary’ ones. According to Rodis-Lewis (Malebranche 1979: 1487) the usual categorization of qualities, into primary (‘elementary’), secondary, occult, and specific virtues originates in Galen, and receives its canonical form in Jean Fernel's *Universa medicina* (1567).

(2) Berkeley contends that the very conception of something unperceived entails a contradiction: ‘when we do our utmost to conceive the existence of external bodies, we are all the while only contemplating our own ideas’ (BW II, 50).

(3) One may see here an illustration of a ‘transdiction’ principle. The term has been devised by M. Mandelbaum (1964: 61). It refers to the (perhaps dubious) inference in virtue of which we extend to the characterization of invisible bodies properties that have been universally found in the visible ones—a practice which, according to Mandelbaum, characterizes Early-modern corpuscular philosophy, and constitutes a distinctive feature of Modern realism. Newton, in his third methodological rule, gave to this transdictive principle its canonical formulation: ‘the qualities of bodies that cannot be intended and remitted…and that belong to all bodies on which experiments can be made should be taken as qualities of all bodies universally’ (*Principia* 795).

(4) In order to account for the various actions and passions of the animal body, the Renaissance physiologists had devised the concept of *spiritus*, or animal spirit, a subtle fluid infused from the brain into the nerves to the various parts of the body, allowing sensation to take place whenever this *spiritus* is touched or affected. By the end of the sixteenth century, through the works of Jean Fernel, Pierre Severin, and Tommaso Campanella, the *spiritus* has been progressively unified, naturalized, and conceived sometimes in atomistic terms. But it is only in the physiological works of Isaac Beeckmann, Descartes' friend and mentor in the formative years, that the *spiritus* was for the first time understood in a fully mechanistic sense. Beeckmann provided a hydro-dynamical model that Descartes took over and refined. This physiological part of the story (de Calan 2008) is of crucial importance to understand the genesis of the modern concept of ‘sensation’.

(5) However, Locke, following a tradition that originated in Gassendist physics and had been transmitted to him through the works of William Digby, Walter Charleton, Thomas Willis, and Robert Boyle, is taking a step beyond this strict conclusion when he contends that those powers are each of them causally dependent on specific arrangements of the particles of the bodies (see *Essay* II. viii. 13). So (and one may see here an important specificity of this tradition) each secondary quality has a true individualized correlate in the physical world, a corpuscular texture, or molecular composition, exerting a specific ‘chemical’ action on the spirits (de Calan 2008: 270–393).