

A Theory of Secondary Qualities

ROBERT PASNAU
University of Colorado at Boulder

The secondary qualities are those qualities of objects that bear a certain relation to our sensory powers: roughly, they are those qualities that we can readily detect only through a certain distinctive phenomenal experience. Contrary to what is sometimes supposed, there is nothing about the world itself (independent of our minds) that determines the distinction between primary and secondary qualities. Instead, a theory of the secondary qualities must be grounded in facts about how we conceive of these qualities, and ultimately in facts about human perception.

No philosophical intuition has a longer history than that which divides sensible qualities into two kinds, primary and secondary. Something like it appears in Democritus, nearly 2500 years ago, and has been continuously maintained in some form or another ever since then. Philosophers today largely continue to think that there is something right about the distinction, even while it remains notoriously difficult to find agreement on just where its ultimate basis lies. As Mark Johnston (1992) puts it, the primary-secondary distinction has “the dubious distinction of being better understood in extension rather than intension. Most of us can generate two lists under the two headings, but the principles by which the lists are generated are controversial, even obscure” (229). I hope to shed some light on this obscure question.

1. The Theory's Intention and Scope

The project will perhaps strike some as quixotic, given the long history of the debate over primary and secondary qualities. I will not be concerned, however, with doing justice to that history. Instead, I want to offer a theory that explains and unifies many of the core intuitions that have been expressed over the centuries, and at the same time explains what is wrong with other, incompatible intuitions. With this theory in hand, we will be able to account for the familiar items on the two lists and also decide on the various hard cases that might seem to defy classification. There will be no need to trail off with the usual, feeble “and so forth.”

Part of what has obscured this question is that it lies hidden among other questions that tend to dominate the debate. As just noted, one question that

will be merely a distraction as far as I am concerned is the historical question of what others have meant by a secondary quality. My starting point is the bare fact that so many philosophers have seen some sort of distinction between primary and secondary qualities; my ambition is not to identify the ground upon which anyone else has based this distinction, but to identify a ground that is both deep and persuasive. It may well be that there are other defensible ways of generating the familiar two lists; I will not try to rule out every such alternative. But I hope to show that my own approach offers a plausible and illuminating explanation.

Another sort of question, which I will likewise avoid, concerns the ontology of the secondary qualities: whether they are categorical, dispositional, or mental. Although this issue often gets treated as the main problem regarding secondary qualities, it is not my present concern. The theory I will propose is intended to be neutral between all the leading accounts of what the colors and other secondary qualities are. This is, I should acknowledge from the start, a controversial feature of my view. It is very often supposed that a physicalist treatment of color (and other secondary qualities) in terms of spectral reflectance patterns (etc.) is tantamount to a denial that colors and the rest are secondary qualities. This is a mistake, or so I will argue. The distinction between primary and secondary qualities rests on deep and stable facts about our perceptual relationship to the world, facts that can be laid out without engaging in any of the standard metaphysical questions about the ontological status of colors and other secondary qualities. Hence there is no reason to make the primary-secondary distinction rest on how those metaphysical disputes turn out.

Still, although my theory is intended to be neutral, I have found it impossible to talk about secondary qualities without making certain assumptions. Throughout, I use the term 'secondary quality' to refer to the properties of things outside the mind, and I likewise follow our ordinary practice of speaking of colors, sounds, etc. as properties of things outside the mind. These assumptions are made for the sake of the argument, inasmuch as I have not always found it possible to frame my arguments in ways that are entirely neutral between different ontological conceptions of secondary qualities. And though I choose to frame the debate in these ways because these strike me as the most plausible positions, I think it will not be hard to see how my claims might be recast to take into account other views. For my opponent, who would ground the primary-secondary distinction on a distinction of ontology, there remains a well-defined challenge: either show that my account cannot be formulated in the terms of that ontology, or show that this ontological distinction has a ground that lies outside my own account. The latter would be more interesting, inasmuch as it would point toward a different conception of what distinguishes primary and secondary qualities. But my own

view is that any such ontological distinction—if it is to be plausible—will ultimately make appeal to the sorts of considerations on which I base my theory.

Finally, in this section, something should be said about the theory's scope. It is natural to suppose that the qualities of a thing just are its properties, which might in turn lead one to think that a theory of the secondary qualities should describe a general formula for categorizing all properties as either secondary or else primary.¹ My proposal is less ambitious, but also more in line with the history of this topic: I am offering an account of how to distinguish between two classes of *sensible* qualities. Although it is commonplace, at least historically, to distinguish between those properties of a thing that are sensible and those that are not, I do not know of any clear and uncontroversial way to draw this distinction, and do not want to insist on any one proposal here. Instead, let me just stipulate that I take sensible qualities to be things like colors, shapes, and sizes, but not things like *being a barn* or even *being beautiful*. Although it is not obvious how to analyze this distinction, the distinction itself seems reasonably intuitive, and will not in any event cause trouble in what follows. Once the scope of the question is limited in this way, I will be able to arrive at very much the traditional two lists of qualities, except that *heat* turns out to belong on the primary side. (At the end of §4, I will briefly consider and reject the suggestion that moral values can be understood as analogous to secondary qualities.)

For this account to be fully general in its scope, even with respect to the limited case of sensible properties (or qualities), I would need to provide a worked-out theory of what properties (or qualities) are—something I will not attempt. Here too, then, I need to make some assumptions for the sake of argument. In general, I will be quite permissive in what counts as a property. Most notably, I will be helping myself to the existence of general (that is, determinable) properties such as color and shape. The theory might be framed in more parsimonious terms—allowing only determinate properties, for instance—in which case much of my talk of properties and qualities would need to be reformulated as talk about our *concepts*. So far as I can see, that might be done while maintaining the account. But it is useful—at least for expository purposes—to follow the usual practice of treating color, shape, et al. (the determinables themselves) as qualities. For, as I will argue, it is at the determinable level that the primary-secondary distinction gets drawn. If we were instead to go case by case at the level of determinate qualities, we would not only need a long time to finish the job, but would also encounter various

¹ This seems to be the assumption at work in Macintosh (1976), who remarks that “there are an infinite, or at least an indefinitely large, number of qualities” (88). Given that starting point, he naturally comes to doubt whether there can be a single distinction between the primary and the secondary qualities. Campbell (1972) explicitly sets out to draw the distinction in a way that would cover all properties.

apparent counterexamples that can be handled (or so I will argue) only by understanding the primary-secondary distinction to take hold initially at a higher level.

2. Primary and secondary concepts

My path into the primary-secondary distinction runs through the concepts we deploy to think about these qualities. As a starting point, I want to consider an account proposed by Crispin Wright. Wright observes that, for both primary and secondary qualities, we can construct true biconditionals of the form

x is Q iff for any S : if S were perceptually normal and were to encounter x in perceptually normal conditions, S would experience x as Q .

In both cases, moreover, biconditionals of this general form can be formulated that are not only true but also knowable *a priori*. There is, however, according to Wright, a crucial difference between the two cases. In the case of secondary qualities, the conditions for normalcy gestured at on the right hand side can be filled in in a way that “is both substantial and such that its satisfaction is independent of the extension of the secondary quality in question” (1988, 21). In the case of primary qualities, in contrast, the only way to make the biconditional come out *a priori* is to build into the right hand side information about the extension of the quality in question, or else to treat normalcy in the loaded sense of *whatever it takes to get things right*. If we do not do this, then all we can say for the biconditional in the primary-quality case is that its truth is knowable *a posteriori*. This is to say that, as a matter of fact, our experiences of qualities like *square* turn out to be veridical when made in the right sorts of circumstances, and so our judgments about *square*, etc., in those circumstances, turn out to get the extension right. With respect to these primary qualities, there is no *a priori* guarantee that our experiences will be veridical and our judgments correct. In contrast, in the case of secondary qualities, there *is* a kind of *a priori* guarantee, inasmuch as we can know *a priori* that an appropriately expanded form of the above biconditional holds true.

What accounts for this difference? Wright’s answer is that our judgments about the secondary qualities, when formed in the appropriate circumstances, *determine* the extension of our secondary-quality concepts, whereas our beliefs about the primary qualities, even when formed in the best circumstances, merely *track* the extension of our primary-quality concepts. In Wright’s words,

[T]he beliefs, if any, which we (would) have formed, or will or would form, under the relevant C-conditions [suitably specified “normal” conditions], *serve to determine the extension* of the concept red. And this claim is to be understood by contrast with the thought that such

beliefs *keep track* of an extension which is independently determined. (Wright [1988], 18; cf. Wright [1992], 79-82, 108-39)

Hence, once we succeed in specifying the proper normal conditions, it turns out to be a conceptual truth that what looks red in those conditions is red. Judgments about redness, in the proper circumstances, determine the extension of the concept *red*. Nothing like that is true for judgments about primary concepts like square. In those cases, we merely track the concept's extension.

Wright does not insist that this is the only way to understand the primary-secondary distinction—only that this is one significant manifestation of that distinction. I have presented his account in some detail because I think that it is both true and the proper place to begin a discussion of the topic. But it is, I think, only a starting point, because Wright's account as it stands does not constitute a full explanation of the primary-secondary distinction. To see why this is so—to see what more there is to say—consider the following substitutions for *Q* in the above biconditional:

Heavy (or Light)

Rough (or Smooth)

Fast (or Slow)

It seems clear, in each of these cases, that we could fill in the biconditional in such a way that it would be *a priori* in just the way that Wright associates with the secondary qualities. This is so because our judgments about heavy, rough, and fast—in the appropriately demarcated circumstances—determine the extension of the relevant concept. It simply makes no sense to imagine that standard observers in standard circumstances might be wrong about whether a thing is *heavy* or *light*. If we think it is heavy, then (unusual circumstances aside) it is, and much the same seems true for cases like *rough* and *fast*. Indeed, there seems no relevant difference between these cases and cases like red and sweet. What all of these examples have in common is that they satisfy Wright's test for being secondary, inasmuch as our judgments in these cases are extension determining. Does this mean that these new cases in fact *are* secondary qualities?

This initial observation points toward a general problem. For each item on the canonical list of sensible qualities, we have the choice—given Wright's criterion—of deploying concepts such that the quality comes out looking primary or else concepts such that it comes out looking secondary. To capture this point, I will speak of *primary concepts* and *secondary concepts*. The point can then be reformulated like this: that each of the canonical sensible qualities is associated with both primary and secondary concepts. We

can speak of an object's weight, for instance, or we can speak of its being heavy or light. We can speak of its texture, or its being rough or smooth. This phenomenon is put on display at length in Berkeley's First Dialogue, at the point where he turns to the case of the alleged primary qualities and systematically shifts Hylas's attention away from primary concepts like *weight*, *texture* and *motion*, toward secondary concepts like *heavy*, *smooth* and *swift*.² But Hylas—or, at any rate, a modern Hylas—might easily deploy Berkeley's own tricks against him, since the same sort of conceptual duality occurs with respect to the canonical secondary qualities. We can speak of a body's *temperature* or its being *hot* or *cold*. We can speak of a surface as *looking red*, or as *having a certain spectral reflectance pattern*. In each case, depending on the concept we choose, our judgments (that is, those of normal observers in normal circumstances) will either track the extension of the relevant concept or determine its extension.

All this looks like bad news for the distinction between primary and secondary qualities: it looks as if one could mount an argument for any class of qualities as either primary or secondary, simply by focusing on the right sort of concept. Conceived in one way, heat will be a primary quality; conceived in another way, it will be a secondary quality. Moreover, *hot* and *cold* look on this analysis to be precisely analogous to the case of *heavy* and *light*. Given Wright's account of the distinction, it is hard to see how we might ever arrive at the familiar lists of primary and secondary qualities.

I believe that we can best extract ourselves from this impasse by focusing the discussion on the level of concepts rather than qualities or properties. Although I aim to endorse the familiar distinction between two kinds of *qualities*, primary and secondary, the proximate ground for that distinction should be understood to lie at the conceptual level. Once we understand that conceptual basis, we can go on to ask whether primary and secondary qualities are to be compared as categorical versus dispositional properties, categorical versus phenomenal properties, or perhaps as equally categorical. But such properly metaphysical questions, though they arise out of the primary-secondary distinction, are subsequent to that distinction. To understand why some qualities are primary and others secondary, we need to do more work at the conceptual level.

With these points in mind, the first observation that needs making is that the way we conceive of the various sensible qualities is ultimately a contingent matter. With respect to any kind of quality, we *could* insist on conceiving of it in terms either of wholly primary concepts or of wholly secondary concepts. To illustrate, we could conceive of weight in wholly secondary terms, as a function of how heavy it feels to us. If we were to employ this conception in a thoroughgoing way, then our judgments about weight would

² *Three Dialogues*, 151-57.

determine the extension of the concept, and we could accordingly formulate a biconditional for weight that would behave just as if weight were a secondary quality. In such a case, I claim, weight would be a secondary quality. The same is true, *mutatis mutandis*, for each kind of sensible quality.³ Just as we might treat a primary quality as a secondary quality—thereby *making it* a secondary quality—we might treat color as a primary quality by conceiving of it strictly in terms of primary concepts. (This would involve letting the extension of concepts like *red* and *green* be determined not by our judgments of how things look but by, for instance, measurements of spectral reflectance patterns, so that the color a surface has would depend not at all on how it looks but only on the categorical properties that give rise to its light-reflectance dispositions.)⁴

We could conceive of sensible qualities in these alternative ways, and there would moreover be nothing *incoherent* about our doing so (though each would of course need to be elaborated in various ways, to do justice to the complexity of the phenomena). Still, though we could conceive of the world in these ways, we would find it dissatisfying and perhaps even absurd to do so. Though we certainly find it useful to deploy the concepts *heavy* and *light*, it would seem bizarre to confine our conception of weight to secondary concepts of this sort. Conversely, visual experience is central to our concept of color, and we would seem to be omitting something crucial if we were to understand color without any reference to such experience.

To say only this much, however, moves us not at all from our impasse, because it still seems to be the case that, for a given kind of sensible qualities, we deploy a variety of concepts, some primary and some secondary. The further point that needs to be made, then, is that although we do not conceive of any kind of quality either purely in terms of primary concepts or purely in terms of secondary concepts, nevertheless there is a marked distinction to be drawn. In the case of the primary qualities, although we may in certain con-

³ Here it is important that the discussion focus on determinable qualities rather than the determinates. There surely are determinate primary qualities that could not be treated as secondary qualities—e.g., weighing exactly three pounds—and there are perhaps secondary qualities that cannot be treated as primary. I will take up this issue in section four.

⁴ Some physicalist theories of color propose this radical step—see, e.g., Averill (1982), who is in effect an eliminativist with respect to our ordinary color concepts. On his view, it routinely happens that two surfaces that look identical in color in standard circumstances in fact have different colors. Other physicalist theories of color preserve the subjective, secondary component of our color concepts inasmuch as they identify colors with categorical surface properties of objects but nevertheless let the extension of our color concepts be picked out by phenomenal experience (see, e.g., Smart 1975). On my account, only the latter theories continue to treat color as a secondary quality. The fact that an Averill-style ontology of color is not compatible with colors' being secondary qualities is not an embarrassment to my theory, but is indeed the proverbial exception that proves the rule, inasmuch as it achieves that result only by departing dramatically from our conceptual framework for color.

texts think purely in terms of secondary concepts, the primary concepts play a pervasive role in the judgments we make. We find it reasonable to ask *Just how heavy was your pack? How fast were you going? How huge was the snake?*, and the answers to such questions will be couched in terms of primary concepts. For the secondary qualities, in contrast, the appeal to primary concepts is, in everyday life, either rare or nonexistent. One might well ask *How spicy was the food? How bad did it smell? How pink was the dress?*, and in at least some cases we have the conceptual and the technological ability to give objective answers in terms of primary concepts. But although we may have the technology and we certainly have the concepts, we simply do not, in everyday life, care about the answers. Despite all that we have learned about the various sensible qualities, our attitude toward the secondary qualities remains fundamentally subjective, as measured by our almost complete concentration on secondary modes of conceiving such qualities.⁵

We now have a way out of the impasse generated by the variety of our sensory concepts, and in a sense this completes Wright's proposal. The outcome, I believe, is a satisfactory criterion for distinguishing between primary and secondary qualities. But this is just the beginning of a theory of secondary qualities, because we can now see that there is a further question to be asked: Why, in the case of the secondary qualities, are we perfectly satisfied with our subjective, secondary conceptions? Or, to put the same question another way, why, in these cases, do we not value objectivity?

3. The basis for the distinction

One might well suppose that there is nothing very interesting to say about why we conceive of the sensible qualities as we do—that such questions are more anthropological than philosophical. In fact, however, the question of why we prefer secondary concepts for the secondary qualities raises many of the same interesting questions raised by the topic of secondary qualities itself—as it ought to, since I am contending that the two topics are in fact the same topic. It is true, however, that my conception of this territory leads us away from certain venerable questions that have traditionally been associated with the secondary qualities. As I have stressed already, I do not think questions about quality realism (e.g., *Are colors really in the world?*) play a part in the primary-secondary distinction, though such issues may well fol-

⁵ For such subjectivism to be possible, it is essential that our phenomenal spaces for each kind of quality be more-or-less shared. For instance, the reason we can get away with conceiving of color according to secondary concepts like *looks red* is that most human observers can use their visual experiences to pick out the same objects. It is not crucial that my experience of red be intrinsically just like almost everyone else's experience of red. What matters is that reddish experiences in me are triggered by roughly the same spectral reflectance patterns as reddish experiences in almost everyone else. As long as this is so, we can talk about color using these sorts of secondary concepts.

low hard on the heels of the distinction. I also do not believe questions of *resemblance* play a part in the primary-secondary distinction, properly conceived. Although Locke famously held that only our ideas of primary qualities resemble their objects, I believe that we can reach a satisfactory understanding of the distinction without taking up that vexed topic. Thirdly and lastly, I do not think the primary-secondary distinction should be made to rest on facts about whether the secondary qualities are reducible to (or explicable in terms of) primary qualities, or whether all and only primary qualities are essential features of bodies, so that anything that is a body must have a quality of this kind (a shape, for instance) but need not have any quality of that kind (a smell, for instance). We can understand the primary-secondary distinction without knowing anything about how such questions will be settled by our ultimate physical account of the universe.

The key to understanding the primary-secondary distinction is to look at how the two classes of qualities are related to our senses. This should not be surprising, given that the primary-secondary distinction is a distinction between kinds of *sensible* qualities. A number of proposals regarding the distinction have been made along these lines, of which two seem at first particularly plausible. First, one might suggest that the secondary qualities are all and only those qualities immediately represented by the intrinsic phenomenal features of our experiences—by qualia, for short. Thus, in the case of each of our senses, there is something that it is like to have that kind of sensory experience, and that phenomenal state, if it represents some feature of the external world (rather than a bodily state like pain or hunger), represents a secondary quality. This account of the distinction has been proposed by A.D. Smith (1990), who remarks that “secondary qualities are those physical features of objects that appear to a sentient subject by the realization in its experience of sensory qualia” (240).⁶

Although there is very little that can be said with confidence about qualia, it seems at least doubtful whether this suggestion is correct. In the case of taste, smell and heat, there is perhaps nothing more to the phenomenal expe-

⁶ Smith goes on to recognize that this formulation faces the difficulty that *every* quality that appears through sensation appears through sensory qualia. I assume, for the sake of argument, that this difficulty can be remedied by the further proviso that secondary qualities are those qualities that appear *immediately*—although this suggestion faces difficulties of the same sort that plague any attempt to specify what sensible qualities are (a matter that I left unresolved in section one).

Shoemaker (1990) also contends that qualia are uniquely associated with secondary qualities: “In recent philosophy the term ‘qualia’ is sometimes used for ... properties of sense experiences that somehow correspond to secondary qualities.... Or rather, it is used to cover these together with certain properties of such sensations as pains and itches, those the having of which by a sensation constitutes its phenomenal or qualitative character, or ‘what it is like’ to have it” (110). Shoemaker tells me (in personal correspondence), however, that he doesn’t have a firm opinion at present on whether there are qualia for primary qualities.

rience than experiencing the relevant qualia. But consider hearing. When we hear an object, we have an experience of a certain sound, and we experience it as having a certain location. That experience of location seems to be a phenomenal element that is over and above the experience of the sound's pitch, loudness, and timbre. Those could remain constant, after all, while the location varies. Hence there seem to be locational qualia involved in sensation. The case of vision is perhaps clearer still. There is, to be sure, something it is like to experience color. But is there not equally something it is like to experience shape, size, location, and motion? As evidence for this, consider the Necker cube. When I flash back and forth between perspectives on the Necker cube, it seems that I am experiencing a change not just (or, indeed, not at all) in my beliefs about the cube, but rather in how I experience the cube. This is a shift at the phenomenal level, but surely not a shift in the *colors* I am experiencing. Hence visual qualia—assuming there are such things—seem to extend to more than just color.

No doubt there are ways of understanding qualia on which they might be restricted to an association with secondary qualities. But such a conclusion would require extended argument. And given the broad and enduring appeal of the primary-secondary distinction, it would be surprising to find that distinction ultimately grounded in something so obscure and doubtful. Still, one might think that secondary qualities can be accounted for in terms of some other distinctive feature of how we experience these qualities. J.J.C. Smart (1963) makes a proposal in this vein: he proposes that our concepts of the secondary qualities are more “anthropocentric” than our concepts of the primary qualities because they are more dependent on “our idiosyncratic, human, terrestrial perspective” (84). This is to say that our grasp of secondary qualities depends on contingent features of our perceptual systems, in a way in which our grasp of primary qualities does not. For instance, “extraterrestrial beings could be expected to have a similar concept of length or electric charge to ours, but we would not expect their colour concepts, supposing that they had any, to correspond to ours in any simple manner” (84). Since our concern is only with sensible qualities, we can set aside the example of electric charge, and focus on the contrast between length and color. On its face, the contrast looks compelling: it is easy to imagine how alien minds might have very different color concepts, or no color concepts at all, but it is hard to imagine how they might lack a concept of length like ours. Although we might disagree with an alien about what counts as tall or short, it seems likely that we would at least share the same space of concepts. In contrast, although we can assume that our alien will be familiar with the full spectrum of electromagnetic radiation, including the visible frequencies, we cannot expect our alien to have anything like the concepts corresponding to our color concepts. A similar point might be made about flavor and odor. In each of

these secondary cases, it is easy to imagine the alien's simply not having our concept space at all.

Even in the case of color, however, Smart's account seems only partly true. Colors are standardly analyzed in terms of hue, saturation and brightness. Of the three, only the first seems anthropocentric in the way Smart describes. As in the case of length, it is hard to see how an alien might have an alien concept space for saturation and brightness. Smart's account looks even shakier in other cases. Consider heat. Of course, we would not expect the alien to have our phenomenal sensations of heat—no more than we would expect the alien to have any phenomenal experiences like our own. But it seems implausible that the alien's concepts of heat could be fundamentally different from ours. For the alien, as for us, things would surely be more or less hot, along a single continuous dimension, very much as things are more or less long. The same is true, or at least largely so, for sound. Although there may be some features of sound that we represent in an idiosyncratic manner, two of our primary concepts of sound, loudness and pitch, are straightforwardly linear, and we could expect the alien to share these for the same reason that the alien would share our conceptions of length and heat. Hence it does not seem that Smart's observations about color can be made to generalize over all the secondary qualities.

What is right about Smart's account is that our concepts of secondary qualities are tied more closely to sensory experience than are our concepts of primary qualities. Inasmuch as we allow those experiences (and our consequent judgments) to determine the extension of our secondary-quality concepts, those concepts are naturally shaped more extensively by the idiosyncrasies of our perceptual systems. This brings us back to where we began this section, however, with the question of *why* our secondary-quality concepts are tied to the senses in this way. My answer is that our information about the secondary qualities is dependent upon a single sensory modality in a way that is not so for the primary qualities. Consider these four pairs:

Hearing : sound

Sight : color

Smell : odor

Taste : flavor

Here are three fairly uncontroversial observations about this list. First, what each of these senses is, most fundamentally, is a complex machine adapted for detecting its associated quality and then pulling certain sorts of information out of that stimulus. Hearing conveys an immense amount of information about the world—e.g., where a thing is, what kind of thing it is, and

what it is doing and thinking—but it does so entirely in virtue of being sensitive to differences in compression waves over audible frequencies. Sight likewise tells us about the world in virtue of being sensitive to certain frequencies of electromagnetic radiation. Similar remarks hold for smell and taste.

A second observation is that, as human beings are, artificial technology aside, each of these qualities is detectable only through its associated sense. Although someone born blind might be able to have, at least partly, the *concept* of color, it is obvious that such a person cannot *detect* colors. The same is true for the other senses (with allowances for the complex interaction of smell and taste). The reason for this, plainly, is that each of these secondary qualities depends on variations at the micro level that cannot be felt or otherwise detected save through the associated sense organ. Whereas the primary qualities—to the extent that they are indeed strictly sensible—are gross large-scale properties, detectable in various ways, the secondary qualities rest on subtle, small-scale differences that would be utterly imperceptible if we did not have sensory powers specifically adapted to their detection.

A third observation is that these biological systems count as *sensory* systems because they represent the presence of a certain quality in the world by triggering within us a certain distinctive *sensation*. These sensations, of course, are the familiar experiences of seeing, hearing, smelling, and tasting. In virtue of having these sorts of experiences, we perceive the world around us. (This much should be uncontroversial even among direct realists.)

Drawing these observations together, I offer the following characterization of primary and secondary qualities:

- The secondary qualities are those sensible qualities to which we have ready access only through a distinctive sort of sensation produced by a specialized sense.
- The primary qualities are those sensible qualities that can be readily detected through various sensory modalities.

Sounds, accordingly, are secondary qualities, because they are readily detected only by hearing, and are represented by a distinctive auditory experience. There is likewise a distinctive sort of experience associated with the location of sounds, since auditory experience represents sounds as having locations. But location can be represented by many other sorts of sensory modalities, and so counts as a primary quality. Colors, odors and flavors can be readily detected only through their associated sensory powers (given the powers we do in fact have), and are each represented by one distinctive kind of phenomenal experience. Shape, size, and motion, in contrast, are easily detected

through various sensory powers (sight, touch, and in some cases hearing), and are represented by various sorts of phenomenal experiences.

The claim that secondary qualities can be readily detected *only through their associated sense* has to be understood with some care. It certainly is true that one can *see* that a certain food is rich, sweet, or spicy, and *taste* that a wine is red. But this sort of perception is inferential; it rests on some prior grasp of the relationship between, say, the color of wine and its taste. That relationship, in turn, can be grasped only on the basis of both sight and taste, since our access to each of these qualities ultimately goes back to these sensory powers. This is what I mean by saying that a secondary quality can be detected only through its associated sense: not that, in every case, the detection has to proceed in this way, but that ultimately our grasp of these qualities comes through some one sensory modality.

The case of sound deserves special notice in this regard. Some intense sounds at the lower end of the auditory range can be felt (you can feel the walls shake), and we see many of the vibrations associated with sound (you can see the movement of a violin string or a stereo speaker). In each of these cases, there is perhaps some element of inference. But there is also some temptation to say that we are directly feeling and seeing the sound. Sound is a special case in this regard because it is caused by relatively large-scale events. Whereas we have no hope of seeing the microscopic events that give rise to the color, taste, and odor of an object, we can very often feel and see the vibrations. Even in this case, however, we feel and see only the grossest movements. For a certain range of vibrations, hearing gives us information that goes far beyond anything we could acquire through touch or sight. (Imagine someone deaf trying to follow a violin sonata by watching how the strings of the violin move.) In terms of the present analysis, only hearing gives us “ready access” to sound.

Whereas we would lack ready access to the secondary qualities if not for the relevant sense, the primary qualities can be *readily detected* through various senses. The italicized words are intended to rule out a different sort of potential counterexample. I am, for instance, willing to count weight as a strictly sensible quality, since it seems that we sense an object’s weight by lifting or pushing it. Can we detect a thing’s weight through any other sense? Only inferentially. Hence weight might seem to count as a secondary quality. It does not meet my criteria, however, because weight is the sort of property that we can easily detect without lifting or pushing. Weight is a function of size, density, and gravity, all of which are readily accessible in various ways. To take just one example, we can drop an object to the floor and *hear* roughly what its weight is by focusing on how long it takes to fall and what sort of noise it makes on impact. This is inferential hearing, to be sure, but the point is that we could readily acquire this sort of information about the

world even if we were utterly unable to detect weight directly by lifting or pushing.

In contrast, in the cases of sound, color, flavor, and odor, without the associated sensory power, we would lack ready access to the quality. If, for instance, human beings lacked a sense of taste, we could not readily infer anything about the taste of wine from its color. This is not to say that, in such cases, we would *altogether* lack access to the quality. We have managed, without specialized sensory organs, to understand the whole electromagnetic spectrum from gamma rays to radio waves; no doubt, we would understand the visible spectrum too, even if we lacked a sense of vision (holding constant our overall cognitive abilities). The same is true for sound, flavor, and odor. Still, in each of these cases, it would take considerable effort to grasp these qualities, given that they are the subtle outcome of complex events at the micro level. That, of course, is precisely why we have senses specifically designed to detect these qualities. If such qualities could be readily detected in some other way—for instance, if colors were the product of properties that could be *felt* like the texture of a surface—then there would have been far fewer evolutionary advantages to acquiring these senses.

As a possible objection to the present account,⁷ imagine that everyone on the planet becomes blind. In this case, given my test, many primary qualities might seem to become secondary qualities. That unhappy consequence can be resisted, however. Although we could in that circumstance no longer *see* the shapes, sizes, and motions of things, we could still detect them in various ways. We could hear things move, for instance, and detect textures by listening to the noise they make when rubbed against one another. Moreover, even if touch were our only access to certain primary qualities, such as shape, it would still not be the case that we would have access to shape through a distinctive sort of sensation. In the case of the secondary qualities, a determinate quality is associated with a distinctive and determinate phenomenal experience. Spicy food tastes like *that*; an airplane overhead sounds like *this*. Nothing of the sort is true for shape: although there are phenomenal experiences associated with perceiving shape, there is no determinate sensation associated with feeling a given kind of shape. Accordingly, even if we wanted to treat shape as a secondary quality, it is not clear how we could do so. What sort of secondary concept could we use to determine the extension of *cube*? We can make some sense of the notion of *feels cube-like*, but the concept is too vague to be of any use in *defining* what it is to be a cube.

The foregoing is not intended as an alternative to the account developed in the previous section, which seems wholly satisfactory as a criterion. But although that Wright-style account should be maintained, it needs to be supplemented by an explanation of why we conceive of sensible qualities in two

⁷ Inspired by Bennett (1971), 101-2. I return to Bennett in the final section of the paper.

very different ways. Hence the challenge set at the end of the previous section was to explain why we treat certain sorts of qualities subjectively (in terms of secondary concepts) and others objectively (in terms of primary concepts). We are now in a position to meet that challenge. In the case of the secondary qualities, what overwhelmingly matters to us is how we represent those qualities in sensory experience. This is partly because each quality is represented by just one distinctive sort of phenomenal experience, and partly because we have no ready access to such qualities other than through our sensations. Hence what overwhelmingly matters to us about compression waves is how they sound to us; what overwhelmingly matters to us about visible light is how it looks to us. Since the seventeenth century, we have been in a position to tell other, more objective (that is, mind-independent) stories about these and other qualities. But although these objective stories are useful for certain purposes, they are no threat to our more subjective conceptual schemes. Outside of the laboratory, the only equipment we have for detecting sound is our sense of hearing; the only equipment we have for detecting color is our sense of sight. In each case, we detect these features of the world through our phenomenal experiences. Hence, those experiences matter enormously, and we are irresistibly drawn toward conceiving of these sensible qualities in terms of subjective, secondary concepts. For the primary qualities, matters are quite different. We do detect weight, size, shape, location, and motion through sensation, and there are phenomenal experiences associated with each of these qualities. Moreover, for each of these cases, we do have secondary concepts, such as *heavy*, *big*, *smooth*, *far*, and *fast*. But such concepts have far less hold on us, because we have so many ways of grasping such qualities. It would be perverse to let the primary qualities be fixed by the phenomenal space of some one sensory modality.

4. Extending the distinction

Critics of the primary-secondary distinction invariably complain that the distinction cannot be extended to all qualities, or even to all sensible qualities. The present theory can be readily extended. Consider glistening.⁸ It clearly satisfies a Wright-style test for being a secondary quality, since what determines whether something is glistening is whether it looks that way to us (in the appropriate circumstances). That this should be so is predicted by the account of the previous section, since glistening can be readily detected only by sight and is associated with a distinctive phenomenal experience.

The hard cases mostly concern touch. Consider texture. It seems to fail the Wright-style test, since the question of what sort of texture a surface has is not *determined* by whether it feels rough or smooth. (In contrast, a thing counts as glistening just because it appears to glisten in appropriate circum-

⁸ Campbell (1972) offers this as well as vibrating (see below) as unsettled cases.

stances.) This is the outcome my theory predicts, since although texture is detected by a certain distinctive tactile experience, it is not only detected by touch. Any sort of texture that will count as a tactile quality can be apprehended, at least to some extent, by sight. Usually, we can see the presence or absence of rough ridges and bumps in a surface. We get further information from the way light reflects off a surface: smooth surfaces shine whereas rough surfaces are dull. The fact that we have these other sources of information gives us reason to conceive of texture in terms of primary, objective concepts. Why would we let texture be *determined* by judgments made in terms of a secondary concept such as *feels rough*, when we have ready access to other means of discriminating texture?

Much the same analysis should be given for vibration. This is a strictly sensible quality, associated with a certain distinctive tactile experience. But we can see and sometimes even hear that things are vibrating, and so it would make no sense here for our concept to be fixed by the dictates of a single sensory modality. Accordingly, we conceive of vibration in terms of primary concepts. That this is so can be seen by comparing the closely allied cases of vibration and sound. Whereas the question of whether something makes a sound is *determined* by whether it is audible, the question of whether it is vibrating is not so determined. We would not find it strange, for instance, to be told that certain subatomic particles vibrate. But it would be quite puzzling to be told that these particles make a sound. For this second claim to be true, there would have to be a story about how someone (or something) can (or at least could) *hear* those particles vibrate.

As this example illustrates, some vibrations (and likewise some textures) are not sensible at all. This is true of the primary qualities in general, but not of the secondary qualities. A thing can be too small (or even too big) for its shape to be perceived, or a motion too slow (or too fast), and so on.⁹ It is a mark of the secondary qualities, however, that this cannot be the case. The only way we can make sense of the idea that things have sounds, colors, odors and flavors is if we can connect these qualities with at least the possibility of their being sensed by the corresponding sensory faculty. This feature of secondary qualities falls directly out of the fact that we understand them in terms of secondary concepts. In turn, this aspect of the primary-secondary distinction helps to explain why the primary qualities are sometimes taken to be the enduring, mind-independent properties of objects. Since the presence of secondary qualities depends on their being perceptible, they are present only contingently: shrink something to a small-enough size, and it will have no secondary qualities. The primary qualities, in contrast, are not understood in

⁹ Strictly speaking, on my usage, such shapes and motions would not be primary qualities, since I have defined primary qualities as certain determinate *sensible* qualities. The present point is that they still count as shapes and motions.

terms of any such relationship to human perceivers, and so to that extent they are more stable and mind-independent.

Texture is a special case of shape, and vibration a special case of motion. The foregoing remarks therefore serve to explain why shape and motion are primary qualities. We can also see why texture and vibration might seem to be problem cases for the primary-secondary distinction. For what texture and vibration have in common, relative to shape and motion, is that they are small-scale qualities, occurring at the limits of human perception. Consequently, texture and vibration are the cases of shape and motion that come closest to being secondary qualities. Because they are difficult to perceive other than through touch, they are strongly associated with certain tactile experiences. Still, they can be perceived by sight and sometimes hearing, and so we conceive of them in objective, primary terms.

To say that a quality is “readily detectable” through a certain sense is to say that one needs no special technology to perceive the quality in this way. One might need to look closely to see that a thing is vibrating, but that would still count as being readily visible. Now, admittedly, there are surely some vibrations and textures that cannot be seen at all, and so are readily detectable only through touch. Does this mean that those vibrations and textures count as secondary qualities? No, what it rather shows is that we make decisions about secondary status in terms of broader classifications. Despite there being some textures that are readily detectable through touch alone, our *concept* of texture is determined by what holds for the class of qualities at large. We have a concept of texture that governs our understanding of the class as a whole, and this concept is a product of what usually holds regarding texture. So the fact that *most* textures that can be felt can also be seen leads us to conceive of texture in terms of objective, primary concepts. In turn, we apply this conceptual framework to all textures.

The same phenomenon occurs across many sensory modalities. For instance, even though a shape drawn on a piece of paper can be readily detected only through sight, we treat such shapes in terms of primary concepts, because that is how we conceive of the class as a whole. The same move may be necessary to explain the occasional case where we have access to the same secondary quality through multiple senses—for instance, if it were to happen that we could both taste and smell the same sensible quality (e.g., sweetness).¹⁰

Highly determinate qualities pose a different kind of problem. Weighing exactly three pounds could hardly be understood as a secondary quality, under any conception, because there is no way for our judgments to determine the extension of a concept so determinate. But it seems that the same might then

¹⁰ I owe the first of these potential counterexamples to Jason Warnick, and the second to John O’Dea.

be said about any highly determinate quality, primary or secondary. Is it our judgments that determine whether a sound is exactly so loud, or exactly such a note? The account of the previous section fares no better than the Wright-style test, inasmuch as that test was formulated in terms of “ready access,” whereas it seems clear that we have no such thing in the case of many determinate qualities, primary and secondary. There is perhaps some temptation at this point to wonder whether such determinate qualities are sensible qualities at all. This, however, has an air of paradox about it: if, for instance, one were to take the not implausible view that the only properties are determinate ones, then it would follow, absurdly, that there are no sensible qualities. Rather than go down that road, we should again realize that the primary-secondary distinction takes hold at the more general level of determinable properties, and by extension gets applied to all the determinate qualities underneath a given determinable. This suggests that the account of the previous section needs to be reformulated as follows (with changes in italics):

- The secondary qualities are those sensible qualities *that fall under (or just are) a determinable kind of sensible quality* to which we have ready access only through a distinctive sort of sensation produced by a specialized sense.
- The primary qualities are those sensible qualities *that fall under (or just are) a determinable kind of sensible quality* that can be readily detected through various sensory modalities.

There is nothing ad hoc about this refinement. Inasmuch as it is the character of our concepts that governs the distinction, one ought to expect that it will be our more general and familiar concepts that do the work, rather than hyperdeterminate concepts that we can scarcely apply without specialized information.

Returning to the tactile qualities, there is one such quality that plausibly belongs on our list of secondary qualities. That is temperature. It is a microscopic property that we readily detect through a specialized sensory system, and that is accordingly associated with a distinctive phenomenal experience. Unsurprisingly, then, we understand temperature in terms of secondary concepts like *hot* and *cold*. But despite fitting my account in these ways, this quality does not belong where it is usually placed, on the secondary list. For although secondary concepts do play a large role in our understanding of temperature, they do not seem to play a definitive role—that is, our judgments based on tactile sensations of heat and cold do not *determine* the extension of our concept of temperature, in the way that analogous judgments do for sound, color, odor, and flavor. Instead, we make extensive use of primary concepts like *75°F*, and we are ready to let our experience-based judgments be

overruled by more objective measurements. This makes the case of temperature look very much like primary qualities such as weight and motion, for which we have important secondary concepts (such as *heavy* and *fast*), but which are governed by primary concepts. (The fact that many of our temperature concepts tend toward the highly determinate is an indication that we are dealing with a primary quality. Given that our senses are not readily able to make highly determinate judgments, it can hardly be the case, on my account, that our conceptions of secondary qualities are predominantly determinate.)

Temperature is perhaps a case of the sort envisaged by Keith Campbell (1972), of a secondary quality that has disappeared, or at least been reconfigured as a primary quality. Campbell suggests that this is happening in an ongoing way with all the secondary qualities, as we acquire the technology to detect them in ways other than through our senses (226). In this, I think he is mistaken: what matters is not whether we *can* detect the secondary qualities through artificial technology, but whether we have the sort of ready access that would diminish the significance of our sensory experience as a guide to that part of reality. Even so, I think Campbell is right to envisage the possibility of a quality's changing categories, and I think it plausible to suppose that this is what has happened with temperature. To say this does not mean, absurdly, that we are losing properties from the world or that, equally absurdly, dispositional or phenomenal properties are changing into categorical ones. Hence a dispositionalist theory of the secondary qualities could accept my claim here by allowing that, as our conceptions of a quality change, the status of that quality changes. If heat was formerly a disposition (I of course remain neutral on the merits of dispositionalism), it has become a categorical property—or, to put the same point more perspicuously, the reference of 'heat' has changed so that it now refers to something categorical. The same sort of shift could happen with any quality.

If such a shift has indeed occurred with heat, then that may look like trouble for my account. For whereas heat counts as a primary quality according to the Wright-style account of section two, the explanatory account introduced in section three predicts that it will be a secondary quality, inasmuch as our sensory access to hot and cold comes through touch alone. The theory can tolerate such a result, however, just so long as we can identify some special factors that explain why our conception of heat should be primary and objective. Such factors are not hard to come by. First, compared to the true secondary qualities, heat can be detected more readily by other means. Indeed, it is often the case that touch is not even the most accurate and reliable guide to heat. A cook, for instance, judges whether a pan is sufficiently hot by *listening* to whether a drop of water sizzles on it. When making fudge, to quote the *Joy of Cooking*, one waits for "a fine overall bubbling with, simultaneously, a coarser pattern, as though the fine bubbled areas were being pulled down for

quilting into the coarser ones.” In such cases, relying on the sense of touch would be not just painful but also hopelessly imprecise. Second, we have equipped ourselves with the necessary technology—thermometers—to make objective discriminations about heat. Why have we done this? The reason, I suspect, is that the precise measurement of temperature matters enormously in many different contexts: kitchens, hospitals, industry, and so on. In contrast, nothing so important rests on making precise differentiations between sounds, colors, odors, and flavors. In these cases, we are content to retain our secondary conceptual framework. Thus the broader contours of the theory I am proposing readily explain why temperature is a primary quality.

Although there are of course many other sensible qualities that might be discussed, I hope the general strategy of my account is clear. It will perhaps be revealing, however, to consider a rather different kind of candidate for being a secondary quality: moral value. The suggestion that there is at least some sort of analogy here goes back to Hume, and has been developed recently by John McDowell.¹¹ I do not intend these brief remarks to make a substantive contribution to that flourishing literature, but only to indicate how my own account might look when extended into other areas.

If moral values are to be at all analogous to the secondary qualities, then I take it that they will have to be somehow *sensible*. The claim would then be that our moral sentiments somehow determine moral values. To be sure, moral values cannot be regarded as strictly sensible, as that phrase was understood in section one. Even so, if moral values are to be merely analogous to secondary qualities, then they might be merely analogous to strictly sensible qualities. Now even the mere claim of an analogy between moral value and sensible qualities is surely controversial, but let us grant it, without worrying about the details of how it could be so. Once we have granted this much, we can proceed to ask how well moral value fits my theory of secondary qualities.

The first test is whether there is a distinctive phenomenal experience in virtue of which we detect moral value. Here it seems to me the analogy has some plausibility. To be sure, we sometimes take ourselves to recognize moral value without feeling any prick from conscience or pride at having done well. Moreover, one might question whether there is enough phenomenal depth and variety in these moral sentiments for them to count as sensory states.¹² Still, it seems to me these difficulties might be answered well enough to keep alive at least an analogy. For although some sensory modalities are quite rich and complex, not all are like that. The sensation of heat, for instance, yields quite crude information about temperature, varying only in

¹¹ *Treatise* III.i.1 (469); McDowell (1985).

¹² I take Wright (1988) to be making a similar point when he asks whether there is anything of “sufficient rawness in the phenomenology of moral judgement” (12).

intensity. This, then, might be our model for conscience (as indeed it often is in the popular imagination). As for the objection that we don't always detect moral value through this sort of moral sentiment, we might again appeal to the case of heat. Just as we often infer from sight or sound that a thing is hot, so too we often perceive moral value inferentially, on the basis of past experiences. As long as moral sentiment is what ultimately drives these judgments, the analogy still seems to hold.

The difficulty for the analogy comes at the second test: Is moral sentiment the only means we have for readily detecting moral value? Here it seems to me that the analogy with heat is all too apt. For just as we have shifted away from a purely secondary conception of heat, it seems to me plausible that we have done the same thing with moral value. Perhaps there was a day when moral questions were determined solely by the verdicts of moral sentiment. Perhaps indeed this is still the case in many circles. Even so, it seems clear that at least among the educated there are other bases for determining moral value. We are open to arguments that appeal not only to how an action *feels*, but also to how it accords with certain basic principles. We may feel no sympathy for chickens but yet be persuaded on purely intellectual grounds to eat only free-range eggs. We take ourselves, in short, to have ready access to moral values through means other than moral sentiment. Now the proponent of an analogy may try to insist that even these other means ultimately rest on sentiment. This conclusion seems strained, however, and out of step with our actual practices. The best evidence for this is that we are willing to let our moral sentiments be overruled by these other sorts of considerations. We may give money to Oxfam, for instance, even though it leaves us feeling cold, because we let ourselves be ruled by an intellectual conviction that this is the right thing to do. Even here, perhaps, moral sentiment plays a role, but it is hard to believe that this is our only fundamental basis for grasping moral value.

The question of secondary status for certain qualities is fundamentally a question of how we conceive of those qualities. If moral value is to be treated on the model of a secondary quality, then we would expect our access to it to be limited to a particular sensory modality. This would then explain why we might let the dictates of that sense determine what counts as moral. What seems to be the case, instead, is that moral value can be grasped in various ways, both through emotion and sentiment, and through reasoning and reflection. Hence if we are to think of it as analogous to a sensible quality, we should think of it as like a primary quality. Our moral sentiments might then be taken to *track* moral value, but would not be regarded as in any way *determining* what is of moral value.

5. The final missing piece

It is an ironic implication of the present account that the early modern authors with whom we associate the primary-secondary distinction were in fact rather far from understanding it correctly. Instead, it turns out to be the Aristotelian tradition that comes closer to getting the distinction right, with its contrast between proper and common sensibles, and its insistence that the senses cannot err regarding the proper sensibles. The first of these claims broadly corresponds to the idea that the secondary qualities are distinguished by being readily accessible through only one sense. The second hints at the idea that, for any secondary quality Q , the fact of its being experienced as Q (in the appropriate circumstances) is what makes it the case that it is Q . Hence, in the case of the secondary but not the primary qualities, there is a kind of conceptual guarantee of infallibility (in the appropriate circumstances).

The Aristotelian tradition took only a few steps toward an adequate account—in particular, the link between being a proper sensible and being not subject to error was left utterly opaque. The present account supplies some of those missing details, but a potentially puzzling gap still remains. I have been arguing that certain qualities are secondary because we conceive of them in mainly secondary, subjective terms (section two), and that that is so because our access to these qualities is overwhelmingly associated with a single sensory modality (section three). Still, one might wonder, is there really nothing about the qualities themselves that enters into an account of their secondary status?¹³

In fact there is something more that can be said. Jonathan Bennett has observed that one can be blind with respect to any secondary quality, and that this blindness can persist indefinitely, unknown to the perceiver. In the case of primary qualities, however, this is impossible. Someone blind to size, for instance, would be able to recognize the blindness in some other way. So although we can perhaps imagine someone's being unable to distinguish, visually, between objects of different sizes, we cannot imagine this disability going unnoticed for very long. One object might be put inside the other, for instance, or lined up against the other so that the difference can be felt, and so on (1971, 96-97). This observation is surely right, and Bennett also seems right in his further claim that the *reason* for this difference is that there are "countless exoteric general facts about how a thing's primary qualities connect with its ways of interacting with other things" (99). For the secondary

¹³ Of course, the dispositionalist will say that colors and the like are dispositional rather than categorical properties (and similarly for the phenomenalist), but I am proceeding on the assumption that this semantic interpretation of our color talk is something that follows from the primary-secondary distinction rather than entering into an explanation of it.

qualities, in contrast, there are not nearly so many such obvious interactions.¹⁴

Bennett's account supplies the final piece necessary for a complete theory of secondary qualities. The reason why our access to certain sensible qualities comes exclusively through certain distinctive phenomenal experiences is that these qualities have few obvious interactions with other things. There is no way to tell what frequencies of light an object reflects without using highly specialized equipment (such as the human eye). The same is true for sound, odor, and flavor. Shape, size, and motion, in contrast, interact in all sorts of obvious ways with the surrounding environment. As a result, these qualities are detectible in many ways, and there is no need for a sensory organ specially adapted for their detection. These remarks also shed light on the case of heat. Unlike the true secondary qualities, heat does interact extensively, in obvious ways, with the environment. This does not *make* heat into a primary quality, because we could all the same—and perhaps human beings once did—treat heat as a secondary quality, defined in terms of how it feels to us. Still, the point about interaction matters, because part of what has driven us toward a more objective conception of heat is that small differences in temperature make a profound difference to our lives.

Taken by itself, Bennett's account does not yield an adequate account of the secondary qualities. What it leaves out, most significantly, is the essential role played by the way we conceive of those qualities. Hence it cannot account for the way primary or secondary status might change as our conceptual scheme changed. So although Bennett has a piece of the correct theory, it is hard to see the whole story from that one piece, and the piece taken all by itself is likely to deceive.¹⁵

¹⁴ Bennett first proposed the theory in his (1965); it was anticipated, to some extent, in Slomann (1964). Pitcher (1971), 221-31, develops the idea further. Campbell (1972) likewise defines the primary qualities in terms of their interacting with the environment, but Campbell crucially (and to my mind wrongly) includes any interactions that can be detected in any way, rather than (rightly) restricting himself to those that are, in Bennett's terms, "obvious, familiar, [and] inescapable" (1971, 99).

It is noteworthy that Wright (1988) endorses Bennett's results but regards the relation between his own account and Bennett's as "a very nice question, which I cannot pursue here" (21n). I take the present account to provide an answer to Wright's query.

¹⁵ I've gotten helpful feedback on this paper from Matti Eklund, Bob Hanna, Mike Huemer, Dave Robb, participants in the Boulder 2003 Summer Seminar, an anonymous referee, and audiences in Boulder and Canberra (especially Laurie Paul, Michael Smith, Kim Sterelny, and Daniel Stoljar).

References

- Averill, Edward Wilson (1982). "The Primary-Secondary Quality Distinction," *Philosophical Review* 91: 343-61.
- Bennett, Jonathan (1965). "Substance, Reality, and Primary Qualities," *American Philosophical Quarterly* 2: 1-17.
- (1971). *Locke, Berkeley, Hume: Central Themes* (Oxford: Clarendon).
- Berkeley, George (1965). *Three Dialogues*, in *Berkeley's Philosophical Writings*, ed. D.M. Armstrong (New York: Macmillan).
- Byrne, Alex and David R. Hilbert (1997). *Readings on Color. Volume 1: The Philosophy of Color* (Cambridge, Mass.: MIT Press).
- Campbell, Keith (1972). "Primary and Secondary Qualities," *Canadian Journal of Philosophy* 2: 219-32.
- Hume, David (1978). *A Treatise of Human Nature*, 2nd ed. (Oxford: Clarendon).
- Johnston, Mark (1992). "How to Speak of the Colors," *Philosophical Studies* 68: 221-63. Reprinted with added postscript in Byrne and Hilbert (1997), 137-76.
- McDowell, John (1985). "Values and Secondary Qualities," in T. Honderich (ed.) *Morality and Objectivity: A Tribute to J.L. Mackie* (London: Routledge), 110-29.
- Macintosh, J. J. (1976). "Primary and Secondary Qualities," *Studia Leibniana* 8: 88-104.
- Pitcher, George (1971). *A Theory of Perception* (Princeton: Princeton University Press).
- Shoemaker, Sydney (1990). "Qualities and Qualia: What's in the Mind," *Philosophy and Phenomenological Research* 50: 109-31.
- Slomann, Aage (1964). "Primary and Secondary Qualities," *Mind* 73: 413-16.
- Smart, J.J.C. (1963). *Philosophy and Scientific Realism* (New York: Humanities Press).
- (1975). "On Some Criticisms of a Physicalist Theory of Colors," in C. Cheng (ed.) *Philosophical Aspects of the Mind-Body Problem* (Honolulu: University Press of Hawaii). Reprinted in Byrne and Hilbert (1997), 1-10.
- Smith, A.D. (1990). "Of Primary and Secondary Qualities," *Philosophical Review* 99: 221-54.
- Wright, Crispin (1988). "Moral Values, Projections, and Secondary Qualities," *Proceedings of the Aristotelian Society* supp. vol. 62: 1-26.
- (1992). *Truth and Objectivity* (Cambridge, Mass.: Harvard University Press).