

# Color Pluralism\*

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## § I INTRODUCTION

Colors are sensible qualities. They are qualities that objects are perceived to have. Thus, when Norm, a normal perceiver, perceives a blue bead, the bead is perceived have a certain quality, perceived blueness. ‘Quality’, here, is no mere synonym for property; rather, a quality is a *kind* of property—a *qualitative*, as opposed to *quantitative*, property. (The quantitative is *a* way of contrasting with the qualitative—perhaps not the only way.)

Not only does perception present objects as colored, but perception also presents what these colors are like. When Norm perceives a blue bead, not only does he perceive the bead to be blue, but he perceives what blue is like. The qualitative nature of the colors is manifest to us in our perception of them. Objects are perceived to instantiate color properties and these color properties are perceived to instantiate higher-order properties that constitute their qualitative character. So, not only does color perception present the existence and distribution of the colors, but it also presents their nature.

The qualitative nature of the colors is both important and a problem.

The qualitative nature of the colors is important because it is part of what we value about color perception. We are acquainted with the colors insofar their nature is manifest to us in our perception of them. Moreover, as Mark Johnston (1992) has emphasized, it is our acquaintance with the colors that is part of what we value about color perception—we value the way the qualitative nature of the colors is manifest to us in our perception of them. Our evaluative attitudes towards the

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qualitative nature of the colors are diverse. They are not invariably positive—the manifest quality of a color may be ugly as well as beautiful. Nor are our evaluative attitudes confined to these aesthetic categories. Thus Herman Melville attributes the mortal terror inspired by the Milky Way to the perceived nature of whiteness:

Is it that by its indefiniteness it shadows forth the heartless voids and immensities of the universe, and thus stabs us from behind with the thought of annihilation, when beholding the white depths of the milky way? Or is it, that as in essence whiteness is not so much a colour as the visible absence of colour; and at the same time the concrete of all colours; is it for these reasons that there is such a dumb blankness, full of meaning, in a wide landscape of snows—a colourless, all-colour of atheism from which we shrink? (Melville, 1851)

The perceived nature of the colors may be important, but it is equally a problem. Pre-philosophically we tend to conceive of the colors the way Hylas, in Berkeley's *Three Dialogues*, initially does—as mind-independent qualities of material objects. It is a problem because it can be hard to understand how the colors, given their qualitative nature, could be materially realized by surfaces, volumes, and radiant light sources as they seem, pre-philosophically, to be. I will consider how reflection on conflicting appearances gives rise to such puzzlement.

## § 2 THE LOCATION PROBLEM

One salient aspect of the qualitative nature of the colors is their division into hues. The hues divide into two mutually exclusive and exhaustive categories—there are achromatic and chromatic hues. The achromatic hues include black and white; the chromatic hues include red, yellow, purple, and orange. The chromatic hues themselves divide into two mutually exclusive and exhaustive categories—there are unique and binary hues. Binary hues are perceptually 'mixed'. Thus, orange is perceived to be both reddish and yellowish. Some hues, however, are perceptually unmixed. Thus, there is a unique green, a shade of green that is not at all yellowish and not at all bluish. There are four unique hues—there are unique shades of red, yellow, green, and blue.

Intrasubjective variation in the spectral location of the unique hues is remarkably narrow. If asked to adjust a green light such that it is not at all bluish and not at all yellowish, normal perceivers will consistently do so within 3nm. In contrast, *intersubjective* variation in the spectral location of the unique hues is remarkably wide. The spectral location of the unique hues varies among normal perceivers by as much as ten percent of the visible spectrum. Thus, something that appears bluish green to one normal perceiver can appear unique green to another normal perceiver

and yellowish green to a third (see Hurvich et al., 1968). The intersubjective variation in the spectral location of the unique hues forms the basis of an argument against the reality of the colors. The argument is adapted from Larry Hardin (1993), but I will depart from Hardin's presentation in two respects: First, Hardin presents the argument as an argument against color physicalism, but it will be clear from what follows how the argument generalizes. Second, Hardin does not clearly distinguish this argument from a distinct anti-physicalist argument. (As Byrne and Hilbert, 2004, have observed.) Specifically, Hardin objects that the unique–binary structure is essential to the hues and is not properly accounted for by any reflectance-based theory of colors, but this does not involve the conflict of appearances the way that the location problem does. An explanation for the failure to distinguish these arguments will emerge in sequel.

Norm is a normal perceiver, at least in the sense that he would pass all the standard tests for normal color vision (such as the Ishihara and the Munsell 100 hue test). When Norm looks at a uniformly colored chip, the chip appears unique green to Norm. Norma, like Norm, is a normal perceiver, she too would pass all the standard tests for normal color vision. However, when Norma looks at the colored chip in the same circumstances of perception, the chip appears yellowish green to Norma, even though the chip has not altered its color.

It is plausible that nothing can be unique green all over and yellowish green all over at the same time. Of course, something can be unique green all over at one time and yellowish green all over at another time, in which case it would have changed its color. Moreover, something can be unique green and yellowish green at the same time by having differently colored parts—by being partly unique green and partly yellowish green. However, it is plausible that nothing can simultaneously and uniformly be unique green and yellowish green. It is plausible that nothing can be unique green all over and yellowish green all over at the same time because nothing can appear unique green all over and yellowish green all over at the same time to a given perceiver. After all, part of what it is to appear unique green is to appear not at all yellowish, but that precludes a unique-green appearing thing from appearing, at the same time, yellowish green all over and a yellowish-green appearing thing from appearing, at the same time, unique green all over.

It seems that Norm and Norma's perceptions of the colored chip cannot both be veridical. If Norm's perception is veridical, then the chip is unique green. If Norma's perception is veridical, the chip is yellowish green. But this violates a manifest exclusion principle. Since nothing can be unique green all over and yellowish green all over at the same time, Norm and Norma's perceptions cannot both be veridical—at least one of their perceptions must be illusory. Specifically, if the unique-green appearance and yellowish-green appearance cannot both be veridical, then either the unique-green appearance is veridical and the yellowish-green appearance is illusory,

or the unique-green appearance is illusory and the yellowish-green appearance is veridical, or both the unique-green and yellowish-green appearances are illusory.

But which, if either, is veridically perceiving the color of the chip? Is the chip unique green, or yellowish green, or neither? Since Norm and Norma are normal perceivers, it is arbitrary to suppose that one and not the other is misperceiving the color of the chip. Since it is arbitrary to suppose that one and not the other of the appearances is illusory, both must be. Norm and Norma's color perceptions must both be illusory, at least in this instance. The reasoning, here, echoes Philonous' challenge to Hylas:

And now tell me, whether you are still of opinion, that every body hath its true real colour inhering in it; and if you think it hath, I would fain know farther from you, what certain distance and position of the objet, what peculiar texture and formation of the eye, what degree or kind of light is necessary for ascertaining that true colour; and distinguishing it from apparent ones. (Berkeley, 1734, 186)

If you can't, then Philonous' suggestion is that any preference for the veridicality of one perception over another is arbitrary. (For criticism of this reasoning see Byrne and Hilbert, 2004).

The location problem for the unique hues can be reconstructed as follows:

1. The uniformly colored chip whose color remains unaltered appears unique green all over to Norm in the circumstances of perception and appears yellowish green all over to Norma in the same circumstances.
2. The chip cannot be unique green all over and yellowish green all over at the same time.
3. Since the chip cannot be unique green all over and yellowish green all over at the same time, the unique-green appearance and the yellowish-green appearance cannot both be veridical.
4. Thus either the unique-green appearance is illusory, or the yellowish-green appearance is illusory, or both are illusory.
5. It is arbitrary to suppose that one and not the other of the appearances is illusory.
6. Since it is arbitrary to suppose that one and not the other of the appearances is illusory, both must be illusory.
7. Thus, the chip is neither unique green nor yellowish green, as it appears to Norm and Norma, respectively.

The location problem is an instance of a more general problem, *the paradox of conflicting appearances*. Many of the arguments of Berkeley's *First Dialogue* share this abstract structure. There are earlier antecedents as well. Plato discusses this paradox in the *Theaetetus*, and it exercised pre-Socratic thinkers such as Democritus, Heraclitus, and Protagoras. (For an insightful account of some of the relevant history, see Burnyeat, 1979.) The paradox of conflicting appearance may lie deep in our history, but it lies deep in our psychology as well. It is among the earliest philosophical problems that humans spontaneously engage with. These facts are, perhaps, not unrelated. Perhaps, it is because humans tend to be puzzled about conflicting appearances early on in their biographies that they tend to be puzzled about conflicting appearances early on in their history.

In its most general form, the paradox of conflicting appearances consists of three claims:

**Variation** x appears F and x appears G

**Veridicality** The F appearance and the G appearance are veridical

**Incompatibility** Nothing is both F and G

In a standard taxonomy that dates back at least to Socrates, the perceptual variation involved in *Variation* can be between humans and other animals, between different human perceivers, and within a single human perceiver at different times. From *Variation* and *Veridicality* it follows that x is both F and G, but this contradicts *Incompatibility*. We have a paradox, an inconsistent set of claims. Which of the claims—*Variation*, *Veridicality*, or *Incompatibility*—should we deny?

This assumes, of course, the validity of the reasoning. A modern response to the paradox that lacks ancient precedent charges the derivation of the contradiction with invalidity. That the chip is both unique green and yellowish green follows from *Variation* and *Veridicality* only on an assumption about how the former is understood. The claim that the chip appears unique green must be understood as a kind of perceptual presentation—the chip's appearing unique green to a normal perceiver must be understood as the perceiver's experience presenting the chip as unique green. So understood, what appears to the subject is the chip and its color, unique green. This, according to the Block's (1999) 'phenomenism'—the view that phenomenal properties are subjective monadic qualities of experience—is a mistake. The quality, unique green, is no part of *what* appears to the subject; rather, that quality is a matter of *how* the color of the chip appears to the subject. Norm and Norma veridically perceive the same color—the phenomenal difference between them is a difference in how that color appears. The qualitative character of color appearance is less a perceptual presentation than a perceptual mode of presentation. A full assessment of the phenomist response would take us too far afield; however, the final section will reveal, in general terms, my misgivings.

Assuming, then, the validity of the reasoning, which of the claims—*Variation*, *Veridicality*, or *Incompatibility*—should we deny?

It might be initially difficult to understand how one could deny *Variation*. After all, the facts of perceptual variation are well known and familiar from ancient times. The sense data theorist, however, would claim that while the facts of perceptual variation may be evident, what is less evident is the *object* of perception. Reflection on the paradox of conflicting appearances and allied antinomies, such as the problems of illusion and hallucination, reveal that the object of perception is distinct from the mind-independent material object. What appears unique green to Norm is a sense datum distinct from the chip. What appears yellowish green to Norma is a distinct sense datum itself distinct from the chip. So there is no one thing that appears F and appears G, and hence *Variation*, as currently formulated, is false.

Sextus Empiricus reports a different response to the paradox:

For it is certain, at any rate, that from the fact that honey appears bitter to some and sweet to others, Democritus declared that it is neither sweet nor bitter, while Heraclitus said that it is both. (Sextus Empiricus, *Outlines of Pyrrhonism*, ii, 63)

If Sextus is to be believed, then Democritus held that reflection on the paradox of conflicting appearances recommends the denial of *Veridicality*. Sextus further reports:

And Democritus in some places abolishes the things that appear to the senses and asserts that none of them appears in truth but only in opinion, the true fact in things existent being the existence of atoms and void; for “By convention,” he says, “is sweet, by convention bitter, by convention hot, by convention cold, by convention color; but by verity atoms and void.” (This means: Sensible objects are conventionally assumed and opined to exist, but they do not truly exist, but only the atoms and the void.) (Sextus Empiricus, *Against the Logicians, adv. math.*, vii, 135–136)

Predicating ‘sweet’ of honey is sanctioned by our linguistic conventions given the way that the relevant collection of atoms impinges upon our organs of taste, but there is nothing in the atoms themselves corresponding to the predication over and above this reaction to atomic stimuli. Similarly, predicating ‘unique green’ of the chip is sanctioned by our linguistic conventions given the way the relevant collection of atoms impinges on Norm’s organs of sight, but there is nothing in the atoms themselves corresponding to the predication over and above this reaction to atomic stimuli. Hardin, in denying *Veridicality*, is a latter day Democritean.

Color realism is not a distinctively philosophical position. That colors are sensible qualities of objects is a commitment that we bring with us to philosophy. Like Hylas,

we tend to conceive of the colors as mind-independent qualities of material objects. We should not revise our commitment to the existence of the colors, so conceived, without compelling reason. Democritean eliminativism and the sense data theory are substantive and controversial positions at variance with our pre-philosophical conception of color. So, I propose to set Democritean eliminativism and the sense data theory to one side, at least for the time being, and look for some other means to avoid paradox. Only if there is no other plausible resolution to the paradox should we deny that material objects are colored.

### § 3 COLOR RELATIVISM

Fortunately, Democritean eliminativism and the sense data theory are not the only responses to the paradox of conflicting appearance, as Protagoras would attest.

According to color relativism, the relation between object, perceiver, and the circumstances of perception determines the colors of things. Color relativism has recently been defended by Cohen (2005a) and McLaughlin (2003), and is consistent with a number of more specific accounts of the metaphysics of color. Thus, there are relativist variants of dispositionalism—accounts according to which colors are dispositions to look colored—such as McGinn (1983). Moreover, ecological accounts such as Thompson (1995), while not forms of dispositionalism, are plausibly interpreted as forms of color relativism.

The color relativist retains *Veridicality* by denying *Incompatibility*. According to the color relativist, unique green and yellowish green are relational qualities. When the chip appears unique green to Norm, what Norm's experience presents, if veridical, is the relational quality unique green for Norm. When the chip appears yellowish green to Norma, what Norma's experience presents, if veridical, is the relational quality yellowish green for Norma. While being unique green for Norm and yellowish green for Norm are indeed incompatible, being unique green for Norm and being yellowish green for Norma are compatible. Norm and Norma are perceiving colors from distinct families. Corresponding to each perceiver is a family of colors potentially determined by that perceiver in relation with the object and circumstances of perception. A family of properties is a plurality of properties that are related in a certain way—there are conditions that unite these properties. The unity conditions of properties that constitute a family include similarity, difference, and exclusion relations and the structure of determinables and determinates in which they stand. While exclusion relations hold within these families—nothing is both unique green for Norm and yellowish green for Norm, relative colors from distinct families are compatible with one another—an object can be unique green for Norm and yellowish green for Norma all over at the same time.

The color relativist retains our pre-philosophical commitment to the existence of the colors by denying their mind-independence. Color realism is thus retained

at the cost of revising our conception of the colors as mind-independent qualities of material objects.

A Protagorean might object that color relativism involves no such revision since the relational character of the colors is part of the very meaning of our color words (see Cohen, 2005a). However, it is no part of the meaning of 'green' that green is relational. Those who are not relativists are not semantically incompetent or otherwise confused about the meaning of 'green'—which is not, of course, to say that monadic color words have as a part of their meaning that color properties are nonrelational. Compare the case of motion. It seems wrong to attribute systematic error to all motion talk prior to the discovery of relativity and wrong to think that our clued in talk of motion involves a change of meaning—which it would have to, if we are now speaking truly whereas before we spoke falsely. The right thing to say is that 'moves' designates a relative property even if it is no part of the meaning of 'moves' that motion is relative to a spatiotemporal framework. That motion is relative is a substantive claim about the nature of motion not settled by reflection on the meaning of public language expressions. Similarly, color relativism is a substantive claim about the nature of the colors not settled by reflection of the meaning of public language color expressions. The semantics of color language is thus no obstacle to understanding color relativism as a revision of our pre-philosophical conception of the colors.

The color relativist, however, is not alone in denying *Incompatibility*. There is a metaphysical alternative to color relativism that denies *Incompatibility* as well and is compatible with the colors being mind-independent qualities of material objects.

#### §4 HARMAN'S DENIAL OF INCOMPATIBILITY

Why believe *Incompatibility*?

It is plausible to suppose that nothing can be unique green all over and yellowish green all over at the same time because nothing can appear unique green all over and yellowish green all over at the same time to a given perceiver. After all, part of what it is to appear unique green is to appear not at all yellowish, but that precludes a unique-green appearing thing from appearing, at the same time, yellowish green all over and a yellowish-green appearing thing from appearing, at the same time, unique green all over.

According to Gilbert Harman, however, this line of reasoning provides no support for *Incompatibility*. From the fact that unique-green appearances and yellowish-green appearances are incompatible, it does not follow that unique green and yellowish green are incompatible qualities. It is logically possible that something can have both colors all over at the same time even if it can never appear to have both colors all over at the same time to a given perceiver in the given circumstances of perception. Thus Harman writes:

On reflection, one must allow that red-green incompatibility may be an illusion. Suppose an object looks red from one angle and green from a slightly different angle. In that case, might we not say that the object is red all over and also green all over, even though one cannot see both colors at the same time? In imagining cases, one forgot about that possibility; one tried to imagine something that looked both red all over and green all over at the same time. But something could be both red all over and green all over at the same time without looking both red all over and green all over at the same time. (Harman, 2001)

An object's appearing red all over may preclude it from appearing green all over at the same time to a given perceiver, but this is consistent with its appearing red all over from one angle and green all over from a different angle. Moreover, this, in turn, is consistent with the object being multiply colored, with its being red all over and green all over at the same time where these colors are perceptually available in different circumstances of perception. Since the incompatibility of red and green appearances is consistent with red-green compatibility, the incompatibility of red and green appearances does not entail that red and green are incompatible qualities.

Harman's thought experiment involves three related components:

1. *The partiality of perception*: The conception of perception as providing a partial perspective on the sensible qualities of objects.
2. *Color pluralism*: The possibility that objects are multiply colored.
3. *Red-green compatibility*: The possibility that an object is red all over and green all over at the same time.

Let me elaborate:

1. *The partiality of perception*. The force of Harman's thought experiment is due, in no small part, to the partial perspective that structures its narrative. In the narrative, different sensible qualities of an object are perceptually available only from different perspectives. According to Harman, perception provides only a partial perspective on the sensible qualities of things—there may be more to the sensible qualities of an object than is manifest in any given perception. Not only is perception partial in the sense that there are properties of an object not perceptually available (objects may have unobservable aspects), not only is perception partial in the sense that some sensible qualities of an object may be occluded from view (the backs of objects are colored as well), but perception is also partial in the sense there are perceptually available properties of an object that are not determined by a given perception. Harman's insight naturally generalizes. If there is more to the sensible qualities of an

object than is manifest in a given perception, then not only might different sensible qualities of an object be perceptually available only in different circumstances of perception, but different sensible qualities of an object might be perceptually available only to different perceivers. The relation between object, perceiver, and circumstances of perception determines which of the sensible qualities of an object are perceptually available. (See Hilbert, 1987, for a discussion of the partiality of perception.)

2. *Color pluralism.* It is this conception of perception as providing only a partial perspective on the sensible qualities of things that dramatizes the logical possibility of color pluralism, that objects might be multiply colored. If the sensible qualities of an object can exceed what is manifest in a given perception, this raises the question whether in veridically perceiving the object to be one color it might also be another color. Perhaps an object can have different colors all over at the same time even if these colors are only perceptually available in different circumstances of perception or to different perceivers. If perception is partial, then it is open whether the perceived object is multiply colored, it is open whether the object has different colors perceptually available in different circumstances of perception or to different perceivers.
3. *Red-green compatibility.* If an object can have different colors perceptually available in different circumstances of perception or to different perceivers, then the incompatibility of red and green appearances leaves open the possibility that the perceived object is red all over and green all over at the same time. Perhaps red and green do not so much as *exclude* one another as they *occlude* one another. Having discovered an object that looks red from one angle and green from a different angle we might, upon reflection, accept that its being red all over and green all over at the same time best explains these observations. Further theoretical investigation might confirm or disconfirm this. From the fact that nothing can appear red all over and green all over at the same time to a given perceiver, it does not follow nothing can be red all over and green all over at the same time.

According to Harman, the appearance of red and red are conceptually distinct—let me explain in what sense. The contrast is sometimes used to mark the distinction between an object appearing to have a sensible quality that it genuinely has and an object appearing to have a sensible quality that it lacks. In response to the problem of illusion, this naturally, if not inexorably, leads to a conception of experience where there is a common component to the veridical and illusory perception of a sensible quality. This is not the present contrast, however. The conceptual distinctness of the appearance of red and red is determined less by objects appearing to have sensible qualities that they lack, but by objects having sensible qualities they do not

appear to have. The contrast is used to mark the distinction between the sensible qualities of an object that the object appears to have and the sensible qualities of an object that it does not appear to have (to a given perceiver, in the given circumstances of perception). That the sensible qualities of an object can exceed what is manifest in any given perception does not entail that there is a common component between veridical and illusory perceptions—though Harman (1990) does independently endorse the common component conception of experience.

The three components of Harman's thought experiment—the partiality of perception, color pluralism, and red-green compatibility—are themselves conceptually distinct. Perception might only provide a partial perspective on the sensible qualities of objects, and this might be compatible with objects being multiply colored, but it is compatible, as well, with no object being multiply colored, and with no object being red all over and green all over at the same time. Moreover, objects might be multiply colored, and this might be compatible with an object being red all over and green all over at the same time; but this is compatible, as well, with no object being red all over and green all over at the same time.

## § 5 COLOR PLURALISM

Just as Harman's thought experiment does not demonstrate that red and green are qualities that an object could simultaneously and uniformly have, neither does it establish the more general claim that objects could be multiply colored. Nevertheless, it is useful to compare this hypothetical color pluralism with color relativism.

Heraclitus writes that:

The sea is the purest and foulest water; for fish drinkable and life-sustaining; for men undrinkable and deadly. (Heraclitus, LXX, DK61)

The Protagorean would assent to this Heraclitean pronouncement, at least as the Protagorean understands it. According to the Protagorean, sea is pure for fishes and impure for men because purity is a relational property, pure relative to fishes and impure relative to men. Indeed, Socrates, in the *Theaetetus* aligns Protagoras with the intellectual tradition stemming from Heraclitus. Socrates may be right that the Heraclitean metaphysics of becoming plays a role in Protagorean relativism; however, that is consistent with Protagoras and Heraclitus differently conceiving the nature of purity. There may be alternatives to the Protagorean understanding of the Heraclitean pronouncement.

Indeed, Myles Burnyeat claims that there is such an alternative:

Heraclitus' message was quite different: not the empty subjectivity of sensible appearances but their one-sided partiality. . . . Are they right or we? The implied answer is that each is right—from his own point of

view. It follows that the different but equally valid points of view are one-sided, partial reflections of reality. At some deeper level, from as it were an absolute god's-eye vantage-point, the opposition and contrast is overcome. The sea is both pure and impure; mud is both clean and dirty; rubbish is wealth. (Burnyeat, 1979, 69)

Harman, in emphasizing the partiality of perception, subscribes to a Heraclitean epistemology. Specifically, Heraclitus and Harman each maintain that the sensible qualities of an object can exceed what is manifest in any given perception. Moreover, in raising the possibilities of color pluralism and red-green compatibility, Harman at least entertains a Heraclitean metaphysics as well. Specifically, Heraclitus maintains, and Harman entertains, that apparently incompatible properties (pure and impure, red and green) are in fact compatible—that the apparent conflict is merely apparent.

How is this an alternative to Protagorean relativism? David Hilbert explains:

If [*Incompatibility*] were false . . . it would not be because color is a relation between object and perceiver. The relevant possibility is that color is a property such that objects are able to instantiate multiple colors at the same time. The relation between the perceiver and the object determines which of these many colors are perceptible in a given set of circumstances but not which colors the object actually possesses. Which properties we are able to perceive depends not only on what there is and what kind of creatures we are, but also on the circumstances in which we are perceiving. (Hilbert, 1987, 38)

The relation between object, perceiver, and circumstances of perception does not determine the color of the object (in the way that it would if colors were relational) so much as it determines the perceptual availability of that color. On the pluralistic hypothesis, the chip is multiply colored—it is unique green all over and yellowish green all over at the same time; it is just that the perceptual availability of these sensible qualities is determined by different relations between the chip, perceivers, and the circumstances of perception. According to the color pluralist, then, the relativist conflates the conditions for the perception of a color for the perceived color.

Color pluralism is consistent with two further metaphysical hypotheses about the nature of the colors:

1. *Physicalism*: Families of colors are families of anthropocentrically defined physical properties, in the case of surface color, most likely reflectance types. (See Hilbert, 1987, and Byrne and Hilbert, 1997, 2003.)
2. *Primitivism*: Families of colors are families of primitive properties. (See Campbell, 1997, Broackes, 1997, McGinn, 1996, and Yablo 1995.)

A surface spectral reflectance is an object's disposition to reflect a certain percentage of light at each of the wavelengths of the visible spectrum. While an object could only have a single determinate reflectance, perceived colors are not determinate reflectances, but determinable reflectances, or reflectance types, that can be represented by sets of determinate reflectances (see Hilbert, 1987). A determinate reflectance is a way of being colored. Perhaps, then, what it is for an object to be multiply colored is for its reflectance to belong to multiple sets of reflectances corresponding to reflectance types perceptually available to potential perceivers. (See Kalderon, 2007, for a defense of the idea that a determinate can fall under different determinables thus allowing it to bear different similarity relations to different properties and so participate in distinct families of properties.) Is the metaphysical picture currently adumbrated a form of physicalism? Perhaps, as Byrne and Hilbert (1997, 2003) maintain, colors are physical, if anthropocentric, determinables of their physical underpinnings. Perhaps, however, as Yablo (1995) maintains, colors are nonphysical determinables of their physical underpinnings. For present purposes, I will remain neutral between these alternatives.

The pluralist response to the location problem is made plausible, if not established, by an analogous response to interspecies perceptual variation. Plausibly, different families of colors are perceptually available to different species. After all, different regions of the spectrum are visible to different species. Some birds and insects perceive light in the ultraviolet range—a range of the spectrum perceptually unavailable to humans. Thus, bees perceive light in very short wavelengths—down to 300nm well within the ultraviolet range which begins at 400nm. Moreover, different species differently divide the spectrum. Most humans are trichromats, but some nonhuman animals are tetrachromats. While chromatic hues perceptually available to humans divide into two mutually exclusive and exhaustive categories—unique and binary hues, tetrachromats can perceive, in addition, ternary hues. Like binary hues, ternary hues are mixed hues; unlike binary hues, ternary hues are mixtures of three rather than two hues. Ternary hues perceptible to tetrachromats exhibit color constancy and color contrast effects and thus are plausibly genuine colors. It is implausible to suppose that trichromats perceive the true colors of things while tetrachromats are subject to systematic, if biologically adaptive, color illusion. But if tetrachromats have equal claim to veridically perceiving the colors of things, then objects have more colors than are humanly perceptible. Thus there are bee colors, a family of colors perceptually available to bees as well as human colors, a family of colors perceptually available to humans. (See Bradley and Tye, 2001. For an insightful recent defense of this see Allen, 2005.) But if it is plausible to suppose that different species perceive different families of colors given interspecies perceptual variation, then it is plausible to suppose that different normal perceivers perceive different families of colors given intersubjective perceptual variation. If it is plausible that

an object can simultaneously and uniformly have a color perceptible to bees and a color perceptible to humans, then it is plausible that an object can simultaneously and uniformly have a color perceptible to Norm and a color perceptible to Norma.

In the *Theaetetus* Socrates objects to a Heraclitean metaphysics on the grounds that it would render language impossible. Scott Sturgeon observed in conversation that a similar objection might be raised against color pluralism. Recall that the intersubjective variation in the spectral location of the unique hues is *wide*—normal perceivers vary in the spectral location of the unique hues by as much as ten percent of the visible spectrum. On the pluralistic hypothesis, each of the normal perceivers are veridically perceiving the colors of things, though they are potentially perceiving different families of colors. However, if different normal perceivers are perceiving different families of colors, then it is hard to understand how there could be sufficient intersubjective agreement about the colors of things for color language to be possible.

One notable feature of color language is its lack of specificity. For the most part, public language only has words for determinable color properties such as red and green. Even very specific color words such as ‘chartreuse’, ‘burnt sienna’, and ‘cadmium yellow’ while designating determinates of green, brown, and yellow, respectively, themselves only designate determinables. English lacks color words for most utterly determinate colors and so does every other public language. While there are words for utterly determinate colors, such as ‘unique green’, this is due solely to the fact that they are describable in terms of determinables for which we have stable color words—unique green is a shade of *green* that is not at all *bluish* and not at all *yellowish*.

Given the intersubjective variation in color perception among normal perceivers, there would be insufficient intersubjective agreement about utterly determinate colors for those not describable in English to have stable color words attached to them. That much is right about the present objection. However, there would be sufficient agreement about what determinable colors objects have for these to have stable color words attached to them. Norm and Norma can agree that the chip is green, even if they cannot agree that that the chip is unique green. Byrne and Hilbert (2004) offer a useful analogy. (I should note that Byrne and Hilbert are not color pluralists: in response to the location problem, they plausibly deny the premise that it is arbitrary to suppose that one and not the other of the appearances is illusory.) Byrne and Hilbert imagine a community of intelligent thermometers that are imperfectly calibrated. Thus while one thermometer may register the temperature as 71 degrees, another may register the temperature as 69, and another as 68. There would be insufficient intersubjective agreement for them to attach temperature words to determinate degrees, but there would be sufficient intersubjective agreement for the community to develop words for hot and cold,

warm and cool. Similarly, there is insufficient intersubjective agreement for English speaking human perceivers to attach color words to utterly determinate colors not describable in English, but there is sufficient intersubjective agreement for the community to develop words for ‘red’ and ‘green’, ‘chartreuse’ and ‘cadmium yellow’. So it would seem that color pluralism is compatible with the possibility of color language after all.

I have only addressed the Socratic, *in principle* objection—I have defended the claim that color pluralism and color language are compossible. Whether color pluralism is compatible with natural languages *as they actually are* is a further empirical matter that would depend on the degree of human perceptual variation corresponding in the right way to the degree of specificity that color words in natural language are capable of having.

It might be objected that the pluralist explanation of the veridicality of Norm and Norma’s color perceptions over-generalizes. The pluralist explains the veridicality of their perceptions by attributing to the chip the colors required to render these perceptions veridical. However, if the color pluralist attributes to the chip whatever colors are required to render Norm and Norma’s perceptions veridical, what’s to stop the color pluralist from attributing to objects whatever colors are required to render any perception veridical? It can seem as if color pluralism would render perceptual error impossible.

This difficulty is not unique to color pluralism. The color relativist faces a similar difficulty. If man is the measure of the colors of things, then it can be hard to understand how a perceiver could be in error about the colors. Notice, however, that the problem arises in a more severe form for the color relativist. According to the Protagorean, there is a constitutive relation between the perception of an object’s color and that color—the relation between object, perceiver, and circumstances of perception *determines* the color of the perceived object. In contrast, according to the color pluralist, there is no such constitutive relation between the perception of an object’s color and that color—the relation between object, perceiver, and circumstances of perception does not determine the color of the perceived object so much as it determines the perceptual availability of the color. As such, the possibility of perceptual error poses a more severe problem for the color relativist than it does for the color pluralist. (Though see Cohen, 2005b, for a relativist rejoinder.)

The way that the partiality of perception motivates color pluralism provides a fairly abstract reason for thinking that pluralism and perceptual error are compossible. The partiality of perception allows for the possibility that in perceiving an object to be one color, it might also be another color. The partiality of perception also allows for the possibility that some circumstances of perception are simply more conducive than others to perceive certain sensible qualities and, hence, with

the possibility that perceivers are in error about the sensible qualities that they perceive in such circumstances. Since the partiality of perception is a coherent alternative that allows both for the possibility of color pluralism and the possibility of systematic perceptual error, color pluralism and systematic perceptual error must themselves be compossible.

In response to the problem of conflicting appearances, color pluralism attributes to the perceived object the colors required to render each of the perceptions veridical. It does not follow that every perception is veridical. Color perception attributes to an object all the colors required to render *certain* perceptions veridical.

There is a potential challenge, however. To see this consider a case of color misperception. It is easy to misperceive the chromatic hue of a surface under strongly colored illumination. Thus a green chip in red light can look black to a normal perceiver. But the pluralist needn't claim that the green chip is also black. Color pluralism doesn't entail that objects have every color they appear to have in every circumstance of perception. But the problem now is this. Any case of misperception can be transformed into a case of conflicting appearances. Norm sees the chip to be green in broad daylight and yet sees the chip to be black in red light. Whereas, the location problem for the unique hues is an *intersubjective* case of conflicting appearances, the present case is an *intrasubjective* case of conflicting appearances. Why accept the pluralist response for one and not the other of these cases of conflicting appearances? It can seem that unless there is an 'independent method' (Hardin, 2003, 199) for determining the colors of things, then, allowing for the possibility of perceptual error requires the pluralist to make invidious distinctions between cases of perceptual variation.

I doubt whether there is an 'independent method' for determining the colors of things (see Byrne and Hilbert, 2004, for criticism). But this does not mean that the pluralist in upholding *Veridicality* in some, but not all, cases of conflicting appearances is making invidious distinctions. Consider the way color contrast effects give rise to intrasubjective perceptual variation. In polychromatic and non-uniformly lit three-dimensional scenes, the chip appears unique green to Norm. However, if the chip is placed against a monochromatic and uniformly lit two-dimensional background of the appropriate color, the chip can appear to be another color. Absent an 'independent method' for the determining the color of the chip it can seem that there is no good answer to the question which perception is veridical. (Cohen, 2005a; McLaughlin, 2003, argue for color relativism on these grounds.)

Suppose that colors are ways of affecting light. If colors are ways of affecting light, then polychromatic and non-uniformly lit three dimensional scenes are more conducive to determining the color of a surface than a monochromatic and uniformly lit two-dimensional background. Why? Colors are qualities determined by dispositions to affect light, specifically, in the case of surface color, they are anthro-

pocentrically determined reflectance types, classes of reflectances whose structure reflects the structure of the visual system. However, the proximal visual stimulus cannot, by itself, determine distal reflectance properties. The proximal stimulus is a spectral power distribution that is itself the function of the reflectance and the illuminant. To determine the distal reflectance type from the proximate stimulus the visual system needs to make assumptions about the nature and location of the illuminant. The visual system relies on spectral information from the general scene as evidence about the nature and location of the illuminant. The problem is that a monochromatic and uniformly lit two dimensional background does not convey sufficient information about the illuminant to accurately determine the distal reflectance type. Perception of surface color is unreliable in those circumstances just as it is when it is sufficiently dark or when the illuminant is strongly colored. Most likely both perceptions are illusory, or if one is veridical, it is only accidentally so.

Notice that this explanation is an answer to the question ‘Which perception is veridical?’. Notice, as well, that this explanation applies only to circumstances where the source of variation is color contrast effects. The explanation wouldn’t carry over to the case where the source of the variation is due to the different nature of the visual systems of distinct species of perceivers. It is the kind of local explanation that ought to be a satisfactory answer, if the evidence is adequate, to the question ‘Which perception is veridical?’. Moreover it is an answer that does not rely on there being an independent method for determining the colors of things. Upholding *Veridicality* in some, but not all cases of conflicting appearances is not invidious, if it is grounded in appropriate explanations of the local sources of perceptual variation.

I do not take myself to have established the pluralistic hypothesis. Indeed, color pluralism faces serious metaphysical challenges—as Shoemaker (2003) has recently argued (though see Kalderon, 2007, for a defense). However, I hope to have said enough for color pluralism to be considered a serious metaphysical alternative to color relativism. Indeed, the availability of this alternative, Heraclitean, understanding of conflicting appearances undermines the case for color relativism.

Protagoreans resolve the paradox of conflicting appearance by denying *Incompatibility*. Corresponding to each perceiver is a family of colors potentially determined by that perceiver in relation with the object and circumstances of perception. While exclusion relations hold within these families, relative colors from distinct families are compatible with one another. Thus an object can be unique green for Norm and yellowish green for Norma all over at the same time.

Notice that it is the claim that the perceived colors are from distinct families that resolves the paradox. The perceived colors, unique green for Norm and yellowish green for Norma, are from distinct families of colors and exclusion relations hold only within these families. That is why unique green for Norm and yellowish green for Norm are compatible qualities. But notice, as well, that while color relativism

implies that Norm and Norma perceive colors from distinct families, the converse implication fails. From the fact that Norm and Norma perceive colors from distinct families, it does not follow that that these qualities are relational. From the fact that Norm and Norma are perceiving colors from distinct families, it follows that they do not exclude one another, but nothing further follows about the nature of these qualities. This has a striking and bizarrely unnoticed consequence—that the alleged relational nature of the colors plays no role whatsoever in resolving the paradox.

Color pluralism is a metaphysically weaker hypothesis than color relativism since it involves fewer metaphysical commitments about the nature of colors—while color relativism entails that the colors are relational, color pluralism does not. It might seem, then, that color pluralism is the simpler and, hence, better explanation of the veridicality of Norm and Norma’s perceptions given the difference in their spectral location of the unique hues. This is a mistake, however. It is not that pluralism provides the simpler and, hence, better explanation than relativism since it involves fewer metaphysical commitments, relativism provides *no explanation whatsoever*. It is the distinctness in family of the perceived qualities that resolves the paradox and not their alleged relational nature.

While color pluralism does not entail that the colors are relational qualities, neither does it entail that the colors are nonrelational. Color relativism is thus a *species* of color pluralism. It is because color relativism is a species of color pluralism that it can seem to explain the veridicality of Norm and Norma’s perceptions despite the difference in their spectral location of the unique hues. But again, it is the distinctness in family of the perceived qualities and not their alleged relational nature that is explanatory. Perhaps the colors are, after all, perceiver relative, but if they are, this must be established on grounds other than reflection on the location problem.

To sum up the argument so far, color pluralism is the best resolution of the location problem (and indeed any instance of the argument from conflicting appearances where it is plausible to retain *Veridicality*) consistent with our pre-philosophical conception of the colors. What’s required to resolve the location problem is that the chip be unique green, yellowish green, and bluish green all over at the same time—Harman’s more radical thesis of red–green compatibility needn’t be the case. Color pluralism may not be something that Hylas initially believes, but it is certainly consistent with his experience as he initially understands it to be. If perception is partial, as a Heraclitean epistemology would have it, then there might be more to the sensible qualities of an object than is determined by any given perception of Hylas’. Material objects may have the sensible qualities that Hylas perceives them to have, but they might have other sensible qualities as well. Color pluralism is, as it were, a *conservative extension* of the hypothesis that the world is as Hylas experiences it to be. The world may be as it appears to be, it is just that it is more than it appears

as well.

## §6 A CLASH OF MODAL INTUITIONS

The location problem, and indeed any version of the argument from conflicting appearances, fails to establish a relativistic conclusion. So why the continuing allure of the argument from conflicting appearances for the descendants of Protagoras?

The location problem, and arguments from conflicting appearances more generally, garner conviction less from the strength of these arguments than from the way they dramatize a clash of modal intuitions. (For a similar diagnoses of the inverted spectrum, see Thau, 2004, and Shoemaker, 2003. For an account of the inverted spectrum argument consistent with the argument of the present essay see Hilbert and Kalderon, 2000.) Specifically, the variation in perception suggests a dependency on the perceiver, and this makes it hard to conceive of the perceived colors as mind-independent qualities of material things. It is for this reason that intersubjective perceptual variation has been taken to support, not only Protagorean relativism, but Democritean eliminativism as well. Indeed, they represent the two ways to deny that objects have mind-independent sensible qualities: whereas the Protagorean denies that sensible qualities are mind-independent properties since they are perceiver-relative and, hence, mind-dependent, the Democritean denies that sensible qualities are mind-independent properties since they are not properties of objects at all. (It is this dependency on the subject that motivates the phenomist response to the location problem as well.)

Let us get clearer about the dependency on the perceiver dramatized by the conflict of appearances.

The intersubjective variation in the spectral location of the unique hues suggests that the appearance of the unique hues depends on the nature of the visual system of the perceiver. The chip appears unique green to Norm and yellowish green to Norma given the different natures of their visual systems. Norm's visual system is so configured that the perceived chip in the circumstances of perception yields a unique-green appearance, whereas Norma's visual system is so configured that the same chip in the same circumstances yields a yellowish-green appearance.

The dependency on the visual system of the perceiver is further confirmed by the fact that there is nothing in the physical makeup of the chip that will allow us to know whether it will appear unique green or yellowish green to a given perceiver. There is nothing in the particular combination of wavelengths reflected by the chip, nor in the microphysical properties of the surface of the chip, that will determine whether the chip will appear unique green or yellowish green. What determines the appearance of unique green is the particular combination of wavelengths reflected, transmitted, or emitted by an object in conjunction with the nature of the visual system of the perceiver. Specifically, it is the opponent processing structure of

the visual system that explains the perception of the unique hues. Post-retinal outputs are recoded into three opponent channels—an achromatic channel and two chromatic channels. The chromatic channels include a red–green channel and a blue–yellow channel. The channels take positive, negative, or zero values. The red–green channel taking a positive value results in a reddish appearance, its taking a negative value results in a greenish appearance, and its taking a zero value results in an appearance that is neither reddish nor greenish. A unique–green appearance, an appearance of green that is not at all bluish and not at all yellowish, is the result of the red–green channel taking a negative value and the blue–yellow channel taking a zero value. (Or so goes the explanation from opponent processing theory. There are, however, reasons to doubt the theory and, hence, the explanation. Specifically, the inability to find the physiological implementation of opponent processing channels raises a real worry about this explanation. For the purposes of this paper I will accept the explanation, since it figures large in Hardin’s arguments for color eliminativism.)

The appearance of the unique hues depends on the visual system of the perceiver, but how does that conflict with the unique hues being mind-independent qualities? Notice, there is no direct contradiction here. Intersubjective variation in the spectral location of the unique hues reveals how the *appearance of unique green* depends on the visual system of the perceiver. This is not, however, directly inconsistent with mind-independence of *unique green*. If perception is partial, as a Heraclitean epistemology would have it, then there is no inconsistency. If perception is partial, then unique–green appearances would depend on the visual system of the perceiver in the sense that the perceptual availability of unique green would depend, in part, on the visual system of the perceiver. However, there is nothing contradictory, or otherwise internally incoherent, about the visual system of the perceiver partly determining the perceptual availability of mind-independent qualities. That a Heraclitean epistemology is at all a coherent alternative demonstrates that the appearance of unique green and unique green are at least conceptually distinct in the sense that an object can have a color that it does not appear to have. Since the appearance of unique green and unique green are conceptually distinct in this way, there is no direct entailment from the modal status of the former to the modal status of the latter. From the fact that the appearance of unique green depends on the visual system of the perceiver it does not follow that unique green itself depends on the visual system of the perceiver.

Given that the appearance of unique green and unique green are conceptually distinct, there is no direct contradiction between the appearance of unique green depending on the visual system of the perceiver and unique green being a mind-independent quality. The sense that these claims are in tension must derive from some further assumption connecting the appearance of unique green and unique green.

One assumption that might generate the conflict is the claim that an appearance of unique green is a *manifestation* of unique green. When Norm perceives the chip, the chip is perceived to have a certain quality, unique green. When Norm perceives the chip, not only does he perceive the chip to be unique green, but he also perceives what unique green is like—unique green is perceived to be not at all bluish and not at all yellowish. The qualitative nature of unique green is manifest in Norm's perception of it. This is a substantive claim. Not all accounts maintain that the colors are manifest in our perception of them. Thus, for example, Descartes (1629-33/1985) held a quasi-linguistic conception of experience where color sensations were the reliable effects of properties whose nature remains wholly unknown in color perception:

... Now I see no reason which compels us to believe what it is in objects that gives rise to the sensation of light is any more like this sensation than the actions of a feather and a strap are like a tickling sensation and pain. (Descartes, 1629-33/1985, 6)

Similarly, the phenominist, in denying that what it is like to perceive a color is a matter of what that color is like, denies as well that the qualitative nature of a color is manifest in our perception of it (see Block, 1999).

Like the mind-independence of the colors, that the colors are manifest in our perception of them is arguably a commitment we bring with us to philosophy. After all, it is implicit in our evaluative attitudes towards color perception—we value the way that the qualitative nature of the colors is manifest to us in our perception of them. One more piece of anecdotal evidence, given the importance of the present point. Hardin (1993) cites the following verse of John Keats:

Do not all charms fly  
At the mere touch of cold philosophy  
There was an awful rainbow once in heaven:  
We know her woof, her texture: she is given  
In the dull catalogue of common things.  
Philosophy will clip an Angel's wings,  
Conquer all mysteries by rule and line,  
Empty the haunted air, and gnomed mine—  
Unweave a rainbow.  
(Keats, *Lamia*, II 229)

Hardin is evidently delighted to see his own attempt to unweave the rainbow so poignantly described by a poet of Keats stature—quite reasonably so. However, he fails to notice, or at least make nothing of, the way his 'cold philosophy' renders unintelligible our evaluative attitudes towards the perceived nature of the colors—the very subject matter of Keats' lament.

We can get clearer on manifestation by contrasting it with two related, if distinct, theses:

1. That sensible qualities are manifest in our perception of them is related to, though distinct from, the thesis that Johnston (1992) calls *revelation*. According to revelation, not only is the nature of a sensible quality manifest in our perception of it, but its nature is also *wholly* revealed—there is nothing more to the nature of a sensible quality than what is manifest in our perception of it. This is a stronger claim than manifestation, and one that is inconsistent with a Heraclitean epistemology since it excludes the possibility that the nature of a sensible quality is only *partly* revealed. (Indeed, Hilbert, 1987, given his commitment to the partiality of perception, describes revelation as ‘the fallacy of total information’.)
2. That sensible qualities are manifest in our perception of them is related, though distinct from, a thesis that G.E. Moore calls the *transparency* or *diaphanousness* of experience:

In general, that which makes a sensation of blue a mental fact seems to escape us: it seems, if I may use a metaphor, to be transparent—we look through it and see nothing but the blue. (Moore, 1903, 37)

When we try to introspect the sensation of blue, all we can see is the blue: the other element is as it were diaphanous. (Moore, 1903, 41)

When attending to what it is like to undergo a visual experience, one attends to how things visually appear; and it would seem that what is manifest is the content of that experience—the perceived object and the sensible qualities it appears to have. This is distinct from the claim that sensible qualities are manifest in our perception of them—transparency involves a claim about what is introspectable whereas manifestation does not. However, if the nature of sensible qualities were manifest in our perception of them, then it is plausible that they would be introspectively indistinguishable from their manifest appearance.

Suppose, then, that sensible qualities were manifest in our perception of them. Thus in perceiving the chip to be unique green, Norm would also perceive what unique green is like—unique green would be perceived to be not at all bluish and not at all yellowish. However, if the appearance of unique green depends on the visual system of the perceiver, then it is hard to understand how it could be the manifestation of a *mind-independent* quality. It is hard to understand how, as Campbell

(1997) puts it, ‘the qualitative character of a colour-experience is inherited from the qualitative character of the colour.’

The Protagorean accepts that the appearance of unique green is a manifestation of unique green. He accepts, as well, that the appearance of unique green depends on the visual system of the perceiver. Since it is hard to understand how the appearance of unique green could be the manifestation of a mind-independent quality given its dependency on the perceiver, the Protagorean concludes that the appearance of unique green must be the manifestation of a mind-dependent quality—indeed, that it is the determination of the relation that obtains between object, perceiver, and circumstances of perception. It is this modal puzzle about how color appearances could be the manifestations of mind-independent qualities that primarily moves the Protagorean. On the basis of this puzzlement he concludes that color appearances are the manifestation of mind-dependent qualities. The location problem, and arguments from conflicting appearances more generally, may fail to establish a relativistic conclusion, but it is not the cogency of these arguments that garners Protagorean conviction, but the modal puzzlement that they dramatize. It is not enough, then, to point out how the location problem fails to establish a relativistic conclusion. The modal puzzlement that moves the Protagorean must also be addressed.

That the colors are mind-dependent qualities is not a uniquely relativistic doctrine. Thus Boghossian and Velleman (1991) maintain that colors are qualities, not of material things, but of mental things. If colors are essentially qualities of mental things, then they are mind-dependent qualities, but they need not be relational for all that. Notice, however, that this subjectivist conception of the colors naturally leads to a Democritean eliminativism since perception would be systematically mis-attributing mental qualities to material things—color perception would involve a projective error. This is to be expected. As I observed earlier, Protagorean relativism and Democritean eliminativism represent the two ways to deny that colors are mind-independent qualities.

Earlier I complained that Hardin fails to distinguish the location problem for the unique hues from a distinct anti-physicalist argument. Specifically, Hardin (1993) objects that the unique–binary structure of the hues is essential to the hues and is not properly accounted for by any reflectance-based theory of colors. This is a distinct objection since it does not involve conflicting appearances the way the location problem does. The objection appeals to the conflict between the physical make up of the chip and its appearance, and not to a conflict between distinct appearances of the chip. We are now in a position to explain Hardin’s failure to distinguish these objections. What primarily moves Hardin is a modal intuition—he is impressed by the way the color that an object appears to have depends on the visual system of the perceiver. Moreover, this modal intuition is dramatized both by the intersubjective variation in the spectral location of the unique hues and

by the lack of a physical correlate to the unique–binary structure of the perceived hues. Hardin fails to distinguish these objections because it is unnecessary for him to do so—what primarily moves him is a modal intuition, dramatized by each, that generates a puzzle about the perceptual manifestation of mind-independent colors.

## § 7 SELECTIONISM

How could the perceiver-dependence of color appearances be reconciled with their being manifestations of mind-independent qualities?

If the dependency on the perceiver were a different dependency relation than the one involved in the relevant notion of mind-independence, then there would be no contradiction here, not even indirectly: color appearances would depend, in one sense, on the visual system of the perceiver; while the colors would be independent, in another sense, of the visual system of the perceiver. If the sense in which the appearance of unique green depends on the visual system of the perceiver is different from the sense in which unique green is mind-independent, then there may be no obstacle to the appearances of unique green being manifestations of mind-independent qualities.

In what follows, I will remain silent on how the relevant notion of mind-independence is to be understood. That notion is notoriously elusive and hard to substantively characterize (see Rosen, 1994, for an instructive discussion of some of the difficulties). Rather, I will try to say enough about that dependency relation for it to be obvious that it does not conflict with color appearances being manifestations of mind-independent sensible qualities.

Internal relations of similarity and difference among perceived colors can be represented by external relations of distance in a space, and an adequate representation requires a space of three dimensions—one dimension each for hue, saturation, and brightness. (I use hue, saturation, and brightness merely to illustrate the dimensions of similarity found in a human color space. Nothing I say depends on hue, saturation and brightness actually being the best way of characterizing our color space. Indeed, its inadequacies are clear. Where, for instance, in the three-dimensional color space is metallic green?) A complete, empirically adequate color space is an exhaustive representation of the similarities in hue, saturation, and brightness—all and only such similarities are represented by the structure of the color space. An adequate representation of the internal relations of similarity and difference suffice to represent the identity and distinctness of color properties, their exclusion relations, and their order of determination. Roughly speaking, perceptual discrimination can be understood as an approach to a limit, and thus the points can be understood as representing the limit to which repeated perceptual discriminations converge. So the identity and distinctness of particular perceived shades, understood as the limit to which repeated perceptual discriminations converge, can be represented

by the identity and distinctness of points in the color space. Exclusion relations among perceived colors are represented by their occupying non-overlapping regions of the space. Thus red excludes green because red and green are represented by non-overlapping regions of the color space. The order of determination among perceived colors is similarly represented by mereological relations among regions of the color space. A particular shade of red is represented as a determinate of the determinable red by the particular shade's location being a proper part of the region associated with the more general property. Red and orange, though not specific shades, are represented by distinct regions of the color space. That they are codeterminates is represented by the fact that they are non-overlapping parts of the broader region of the color space that represents the property of being reddish. A representation of the internal relations of similarity and difference suffice in this way to represent the identity and distinctness of color properties, their exclusion relations, and their order of determination.

The color space is determined by the nature of the visual system. We have at least seen how the unique–binary distinction depends on opponent processing. So how could this space represent the unity conditions of a family of mind-independent qualities?

There are a variety of relations, taken in extension, that obtain among pluralities of objects in the perceiver's environment. Some of these similarities will be more natural, some will be less. The visual system determines which of these relations are perceived as similarities in hue, saturation, and brightness. The familiar metaphors of *detection* and *projection* are inadequate. The visual system of the perceiver neither straightforwardly detects color similarities, nor does it project color similarities onto pluralities of objects in the perceiver's environment; rather, the visual system of the perceiver *selects* which of these relations are perceived as similarities in hue, saturation, and brightness. (See Hilbert and Kalderon's, 2000, defense of this. See also Gibbard, 1996, Kalderon, 2007, and Shoemaker, 2003.)

Shoemaker (2003) sympathetically and insightfully characterizes selectionism as follows:

For any ordered set of properties we can define a similarity relation such that the degree of similarity of two properties in the set is determined by how close they are to each other in that ordering. Perhaps most of these should count only as relations of "quasi-similarity." But what determines which of these relations count as "real" or "genuine" similarity relations? A first step towards an answer is to say that such a relation is a genuine similarity relation if it makes properties similar to the extent that their instantiation bestows similar causal powers. But what sorts of causal powers are relevant will vary depending on our interests. In the case of sensible properties of things, the relevant powers include the powers

to affect the experiences of perceivers; and in the case of the so-called “secondary qualities” these are close to being the only powers that are relevant. Powers to affect experiences will be grounded in powers to affect the physical states of perceptual systems. And given that a perceptual system realizes a repertoire of perceptual experiences standing in certain similarity relations, there is an obvious sense in which its physical nature determines what properties bestow the powers to produce in the possessor of the system experiences belonging to that repertoire, and what relations among these properties bestow similarities with respect to these powers. In this sense the nature of the perceptual system “selects” what properties are to count as sensible properties, and what relations among them are to count as similarities with respect to these properties.

The selective activity of the visual system of the perceiver is consistent with similarities in hue, saturation, and brightness supervening on mind-independent colors. In selecting which of the relations among pluralities of objects in the perceiver’s environment are perceived as color similarities, the visual system does not *bring into being* these relations—color similarities neither causally nor existentially depend on the visual system of the perceiver. Rather, the visual system selects which of these pre-existing relations are perceptually available. H.H. Price offers the following analogy:

If I am to select a bun from the counter my hand must be there to pick it up. If I move my hand to the left I pick up bun No. 1, if to the right, bun No. 2. But the bun which I do pick up is in no way dependent upon my hand for its existence, nor my hand upon the bun. Hand plus bun do not form an organic whole, and either could exist without the other. Still less can we say that the hand creates the bun. (Price, 1932, 40)

The selective activity of the visual system does not determine color similarities; rather it determines the perceptual availability of these similarities and, hence, the perceptual availability of the colors. Of course, the selected relations and the colors they supervene on will reflect the nature of the visual system. Colors are thus anthropocentric in something like David Wiggins’ (1987), and Hilbert’s (1987), sense of the term, but being anthropocentric makes colors neither less real nor less mind-independent.

The selective activity of the visual system determines which color similarities and, hence, which colors are perceptually available to the perceiver. Given the nature of Norm’s visual system, Norm’s visual system selects certain relations as relations in color similarity and, hence, which colors are perceptually available to Norm. Given the nature of Norma’s visual system, Norma’s visual system selects certain relations

as relations in color similarity and, hence, which colors are perceptually available to Norma. Since Norm and Norma’s visual systems select different relations as color similarities, different families of colors are perceptually available to Norm and Norma. This is no obstacle to Norm and Norma veridically perceiving the colors of things—Norm and Norma perceive different families of colors and exclusion relations only hold within families of color properties.

The veridicality of Norm and Norma’s color appearances is not directly inconsistent with their being manifestations of mind-independent colors. Given the selective activity of the visual system, similarities in the perceiver’s environment are perceptually available to some perceivers but not others. If selectionism is true, then perception is partial. However, if perception is partial, as a Heraclitean epistemology would have it, then color appearances would depend on the visual system of the perceiver in the sense that the perceptual availability of the colors would depend, in part, on the visual system of the perceiver. However, there is nothing contradictory, or otherwise internally incoherent, about the visual system of the perceiver partly determining the perceptual availability of mind-independent qualities. Hence, there is nothing contradictory, or otherwise internally incoherent, about color appearances being manifestations of mind-independent colors.

Color appearances would depend on the visual system of the perceiver in the sense that the visual system selects which relations among pluralities of objects in the perceiver’s environment are perceived as color similarities and, hence, which family of colors is perceptually available. Nevertheless, colors could be independent, in another sense, of the visual system of the perceiver. The selected family of colors might not be very natural—though natural enough for their instances to be among the causal antecedents of color perception, the selected family of colors might only be perceptually available in certain circumstances of perception or to certain perceivers, but the colors could be mind-independent qualities of material objects for all that.

The possibility of color pluralism may undermine the explicit argument for color relativism, but it is the selective nature of color perception that addresses the modal puzzlement that motivates Protagorean relativism and Democritean eliminativism alike. Selectionism provides an interpretation of the dependency of color appearances on the visual system of the perceiver that is consistent with color appearances being manifestations of mind-independent qualities of material objects.

## § 8 COULD THE MIND–BODY PROBLEM BE AN ILLUSION?

The philosophical problem about the nature of the colors structurally parallels the philosophical problem about the nature of the mind—understood as the ‘hard problem’ of consciousness. This parallel moves Johnston (1996) to describe the philosophical problem about the nature of the colors as ‘the mind–body problem

on the surfaces of things'. The description is in one sense apt since it highlights the parallel, but it is in another sense inapt—the mind–body problem derives from a particular response to a problem about the colors and not the reverse.

First the parallel.

The qualitative nature of the colors present a problem since it can be hard to understand how the colors, given their qualitative nature, could be materially realized by surfaces, volumes, and radiant light sources. This is a special case of an ancient problem that Sellars (1963) describes as the problem of reconciling the manifest image of nature with its scientific image. The problem of the manifest animates the views of ancient thinkers such as Democritus, Heraclitus, and Protagoras as well as modern thinkers such as Descartes, Galileo, and Locke. Thus, for example, Galileo, rightly impressed by the emerging natural philosophy to which he importantly contributed, came to believe that the material world could be exhaustively described in quantitative terms. But then it became hard to understand how the colors, given their qualitative nature, could be materially realized. On this basis, Galileo concluded that the colors must be the mental effects of material objects.

Similarly, the qualitative nature of consciousness present a problem since it can be hard to understand how consciousness, given its qualitative nature, could be materially realized by our bodies. Wittgenstein vividly describes this puzzlement as the 'feeling of an unbridgeable gulf between consciousness and brain process' which occurs when I:

... turn my attention in a particular way on to my consciousness, and astonished, say to myself: THIS is supposed to be produced by a process in the brain!—as it were clutching my forehead. (Wittgenstein, 1958, I: 412)

This 'feeling of an unbridgeable gulf between consciousness and brain process' is what Levine (1983) has called *the explanatory gap*. Unlike the problem of the manifest, the explanatory gap is a peculiarly modern problem lacking ancient precedent. An explanation for why this should be so will emerge in sequel.

The problem of the manifest and the mind–body problem are structurally parallel. Furthermore, the arguments that dramatize these problems are close variants. Just as conflicting appearances can pose the problem of the manifest, so too can conflicting appearances pose the explanatory gap—think of the way that reflection on the inverted spectrum has been used to argue against behaviorism, functionalism, and physicalism. Moreover, just as the limitations of what could be known solely on the basis of our knowledge of the material world can pose the problem of the manifest so too can these limitations pose the mind–body problem. We have seen how our knowledge of the physical makeup of the chip is insufficient to know whether or not the chip appears unique green to Norm. Similarly, this knowledge, even augmented by knowledge of the physical makeup of Norm and the circumstances of perception,

is insufficient to know what it is like for Norm to perceive unique green (see Jackson, 1982).

It is odd that ‘qualia’ is now standardly used to designate qualitative properties of mental things. This was not always so, and the older usage persists at least into the mid-twentieth century. Thus, Goodman (1951) uses the term to designate qualitative properties full stop. On this older usage, it is a further, substantive claim that qualia are essentially properties of mental things. The shift in usage seems to have occurred some time in the seventeenth century. Thus, Walter Charleton, following Gassendi, in a vein that will subsequently become typical, writes:

Quality [of a concretion, i.e. compound Body] is *that kind of Appearance, or Representation whereby the sense doth distinctly deprehend, or actually discern the same, in the capacity of its proper Object.* An *Appearance* we term it because the *Quale* or *Suchness* of every sensible thing, receives its peculiar determination from the relation it holds to that sense, that peculiarly discerns it. (Charleton, 1654)

How did this shift come about? I speculate that it was the result of a particular response to the problem of the manifest of which Galileo’s account in the *Assayer* is a model. (I do not mean to claim that the account in the *Assayer* initiates this tradition, only that it is a notable exemplar.) Having found no room for sensible qualities in a nature exhaustively described in quantitative terms, Galileo concludes that sensible qualities are mental effects of material objects. Shoemaker (2003) describes this kind of response to the problem of the manifest as the ‘kicking upstairs into the mind’ of the qualitative nature we confront in color perception. ‘Kicking upstairs into the mind’ need not take the form of Democritean eliminativism the way it does in the *Assayer*. Thus Locke understands the colors to be the mental effects of material objects—they are ‘powers’ to produce ideas of these qualities. But secondary qualities, so conceived, are qualities that material objects can genuinely have, and so Locke is implausibly interpreted as a color eliminativist.

Suppose one accepts this kind of response to the problem of the manifest. Suppose, that is, that the qualitative nature we confront in color perception is ‘kicked upstairs into the mind’. If one subsequently comes to regard the mind as part of nature and so materially realized, the old problem returns in new form. After all, conflicting appearances pose not only the problem of the manifest but the explanatory gap as well. Indeed, Levine explicitly appeals to conflicting appearances in presenting the explanatory gap:

Let’s call the physical story for seeing red “R” and the physical story for seeing green “G”. . . . When we consider the qualitative character of our visual experiences when looking at ripe Macintosh apples, as opposed to looking at ripe cucumbers, the difference is not explained by appeal to G

and R. For R doesn't really explain why I have the one kind of qualitative experience—the kind I have when looking at Macintosh apples—and not the other. As evidence for this, note that it seems just as easy to imagine G as to imagine R underlying the qualitative experience that is in fact associated with R. The reverse, of course, also seems quite imaginable. (Levine, 1983, pg. 356-7)

That the mind–body problem closely parallels the problem of the manifest in structure and argumentation is no accident—the mind–body problem derives from a particular response to that problem. One may well wonder whether any progress has been made.

However, the Galilean response to the problem of the manifest is not inexorable. There are alternatives to 'kicking upstairs into the mind' the qualitative nature we confront in color perception. This essay has sketched one such alternative. Perhaps it can be sustained, perhaps not. The important point, however, is that if there are alternative responses to the problem of the manifest, then our understanding of the mind–body problem is transformed. From the perspective of any such alternative, it can only be understood as involving an *introjective error*—in posing the mind–body problem, at least in its present form, we systematically misattribute mind-independent qualities to mental things. In wondering how the perception of unique green, given its qualitative nature, could be materially realized by the visual system of the perceiver one attributes to something mental, the conscious perception of unique green, the qualitative nature of a mind-independent color. It is no wonder that the mind–body problem is widely regarded as having no intellectually satisfying resolution—it could have none, if, as I suggest, it rests on an introjective error.

This is the sense in which Johnston's description is inapt—it obscures how the mind–body problem derives from a particular response to the problem of the manifest. It is less that the problem of the manifest is the mind–body problem transposed to perceived surfaces of material objects, than the mind–body problem is the problem of the manifest transposed to perceiving minds. (For a similar conclusion see Byrne, 2006a,b.)

From this perspective, as Shoemaker has observed, Wittgenstein's puzzlement would have been better expressed as follows:

I look at a shiny red apple and say to myself "THIS is supposed to be a cloud of electrons, protons, etc. scattered through mostly empty space." And focusing on its color, I say "THIS is supposed to be a reflectance property of the surface of such a cloud of fundamental particles." (Shoemaker, 1996)

Similarly, Frank Jackson's knowledge argument would have been better expressed as a puzzle about color—when Mary leaves her black and white room, what Mary learns

is not primarily what an experience of red is like but rather what red is like. Retold in these terms, the knowledge argument merely dramatizes the problem of the manifest. This is the general source of my misgivings about Block's phenominism. Phenominism is a philosophical position only intelligible in light of a particular response to the problem of the manifest that there are good grounds to reject.

If the claims of the present essay are correct, then perceptual attributions of color involve no *projective error*. However, the mind-body problem, as currently understood, may well involve an *introjective error*.

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