

# Kripke on Color Words and the Primary/Secondary Quality Distinction

MARIO GÓMEZ-TORRENTE

Instituto de Investigaciones Filosóficas, UNAM; México DF 04510, Mexico  
*mariogt@servidor.unam.mx*

## 1. The Lockean primary/secondary quality distinction and Kripke's reaction to it.

Many philosophers, especially since the seventeenth century, have thought that the sensible properties of objects divide into two very different kinds. For these philosophers, determinate properties of color, sound, heat or cold, taste and smell are in a way subjective or less real than properties such as solidity and determinate shape, motion and mass. In the seventeenth century, in particular, arguments for this divide played a role in defenses of the superior objectivity of the new physics, that was formulated in terms of properties of the latter group. In his influential treatment, Locke proposed that properties of color, sound, etc. are merely “powers to produce various sensations in us” (*Essay Concerning Human Understanding*, II.viii.10), dispositions that an object has to produce certain sensations in humans; he called these dispositions *secondary qualities*.<sup>1</sup> He also postulated that solidity, the shapes, etc. are non-dispositional, or *primary qualities*. Thus, for example, on Locke's view, an object's being yellow consists in its power or disposition to produce sensations of yellow, not in any intrinsic causal ground of that power. On the other hand, an object's being spherical is an intrinsic property of it, different from its disposition to produce sensations of spherical shape in us under some circumstances, or from any other disposition it may have.

<sup>1</sup> Locke's secondary qualities also included other dispositions (see *Essay* II.viii.23 and 25). In the current usage, that I will follow, 'secondary qualities' is reserved for powers to produce sensory effects. It is a matter of exegetical dispute whether this characterization is compatible with other claims Locke makes about secondary qualities, and even whether the phrase just quoted is to be interpreted as it usually is. Stuart (2003) is a recent discussion of these issues.

The Lockean view appears to have been a dominant view on color, sound, etc. among analytical philosophers until about the mid 1980's.<sup>2</sup> One of the exceptions had been Kripke in *Naming and Necessity*:

To understand [the dispute over primary and secondary qualities], it is especially important to realize that yellowness is not a dispositional property, although it is related to a disposition. Many philosophers for want of any other theory of the meaning of the term 'yellow', have been inclined to regard it as expressing a dispositional property. At the same time, I suspect many have been bothered by the 'gut feeling' that yellowness is a manifest [non-dispositional] property, just as much 'right out there' as hardness or spherical shape. The proper account, on the present conception is, of course, that the reference of 'yellowness' is fixed by the description 'that (manifest) property of objects which causes them, under normal circumstances, to be seen as yellow (i.e., to be sensed by certain visual impressions)'; 'yellow', of course, does not *mean* 'tends to produce such and such a sensation'; if we had had different neural structures, if atmospheric conditions had been different, if we had been blind, and so on, then yellow objects would have done no such thing. If one tries to revise the definition of 'yellow' to be, 'tends to produce such and such visual impressions under circumstances *C*', then one will find that the specification of the circumstances *C* either circularly involves yellowness or plainly makes the alleged definition into a scientific discovery rather than a synonymy. If we take the 'fixes a reference' view, then it is up to the physical scientist to identify the property so marked out in any more fundamental physical terms that he wishes. (Kripke (1972), 140, n. 71)

On the "fixes a reference" view, the property of being yellow is (if anything) the non-dispositional property, whatever it is, that causes sensations of yellow in certain paradigmatic circumstances.<sup>3</sup> In this 'yellowness' is similar to terms for natural substances, phenomena and kinds, whose referent, but not their meaning, is given by descriptions that mention a paradigmatic sample, described in terms of overt properties of its members. Thus, for example, the reference of 'gold' is rigidly fixed by some such description as 'the substance instantiated by the items over there, or at any rate, by almost all of them' (Kripke (1972), 135). The fact that, in the case of 'yellowness', the description in question mentions

<sup>2</sup> Such is McGinn's historical appraisal in (1983), 5, and (1999), 313 (Mackie's in (1976), 7, differs). Since the late 1980's there has been a boom of publications about color, in which positions such as physicalistic realism and eliminativism have also taken an important following.

<sup>3</sup> Kripke's use of the phrase 'normal circumstances' is to be distinguished from the use of similar phrases in the dispositionalist literature discussed below. As we will see, the typical dispositionalist will need to specify *a priori* an exhaustive list of "normal conditions" in which an object is yellow iff it produces a sensation of yellow. Kripke merely uses 'normal circumstances' as short for some minimally comprehensive list of paradigmatic circumstances in which we call certain objects yellow, and claims that the specification of an exhaustive list of "normal conditions" in the dispositionalist's sense would either be circular or involve *a posteriori* discoveries. This will be a theme developed in his work expounded below.

the production of certain sensations as a relevant overt property does not imply that yellowness is the mere disposition to produce them. From this perspective yellowness is, if anything, a primary quality<sup>4</sup>, closely related to natural substances, phenomena and kinds.

The 1980's saw a strong interest in renewed defenses of broadly Lockean dispositionalist views of color, sound, etc.<sup>5</sup> These defenses often share a number of new features. First, contemporary Lockeans sometimes formulate their doctrine in terms of biconditionals of the form 'an object is yellow iff ...', not in terms of the stronger Lockean statement of property identity.<sup>6</sup> Second, it is not simply claimed that an object is yellow iff it would produce sensations of yellow in us. What is postulated is that an object is yellow iff it would produce sensations of yellow *in normal humans under normal conditions*.<sup>7</sup> The reason for the qualification in italics is that contemporary dispositionalists want to accommodate the fact that in many cases we talk of the real as opposed to the perceived color of an object, e.g. in cases where the perceiver we have in mind is color-blind, or in cases where illumination is provided by some unusual light. The phrase 'in normal humans under normal conditions' is taken to be short for a complete, non-trivial specification of the cases where the color of an object is the color it appears to have.<sup>8</sup> Kripke noted, however, that the intended biconditional should presumably be something like "an object is yellow

<sup>4</sup> Other non-dispositional philosophical views of color had been defended, e.g., by Smart (1963) and Armstrong (1968) (see also Smart (1975)), though with a motivation and apparatus very different from Kripke's. Averill (1985) usefully brings out some of these differences.

<sup>5</sup> Among the authors who defend dispositional views in this period one may mention Evans (1980), McGinn (1983), Peacocke (1984), McDowell (1985), Nagel (1986), Wright (1988), (1989) and Smith (1990). Part of this literature grew out of attempts to argue that certain philosophically problematic non-sensible properties (e.g., moral properties) are also dispositions to produce certain subjective responses.

<sup>6</sup> Though some dispositionalists (e.g. Wedgwood (1998)) argue that some stronger formulation in terms of properties is needed.

<sup>7</sup> In some slightly different alternative formulations, sensations are replaced with either experiences or immediate perceptual judgments (that the relevant object is yellow). Sensations are taken to be items with a phenomenal quality but no intentional content, while experiences are taken to possess both a phenomenal quality and a content, and judgments a content but (perhaps) no peculiar phenomenal quality. The considerations in this article (and in particular Kripke's arguments expounded below) seem to apply indifferently to all these formulations (with little modifications).

<sup>8</sup> A trivial specification would be, e.g., "under conditions in which the object is yellow iff it looks yellow".

iff (it can be observed by normal humans under normal conditions and it would produce sensations of yellow in normal humans under normal conditions)”. (Given the standard understanding of counterfactuals, the unmodified biconditionals imply that if there is an object that could not be observed under normal conditions, it is of all colors.) Finally, a third typical feature of the defenses alluded to is that they postulate that the relevant biconditionals are *a priori* or true as a matter of conceptual necessity.<sup>9</sup> This thesis is meant to sustain the required Lockean division of the sensible qualities. Perhaps there is a complete, non-trivial spelling out of ‘in normal humans under normal conditions’ for which it is true as a pure matter of fact that, e.g., an object is spherical if and only if it would produce sensations of sphericity in normal humans under normal conditions. But, on the views in question, for no such spelling out is this biconditional *a priori*.

Partly in reaction to this literature, Kripke expanded and refined his opposition to dispositionalist views of color, sound, etc. in seminars at Princeton in 1987 and 1991, and also in some talks in the late 1980’s, notably in a long talk at the University of Michigan in 1989.<sup>10</sup> In these lectures Kripke began by criticizing several arguments for Lockean dispositionalism and for Locke’s division of the sensible qualities. He was almost exclusively concerned with discrediting arguments designed to establish these doctrines *a priori*, but he criticized some attempts to use empirical evidence as well. Kripke also presented a battery of direct counterexamples to the thesis that the dispositionalist biconditionals could be formulated *a priori*, and also, less crucially, to the thesis that some of the biconditionals actually proposed are metaphysically necessary; these examples parallel, respectively, his epistemic and modal arguments against descriptivist theories of proper names in *Naming and Necessity*. Finally, he qualified the “fixes a reference” view of color by developing new positive views about the semantics and overall functioning of words for colors and other sensible qualities, views that help explain our intuitions about his counterexamples to dispositionalism.

<sup>9</sup> See e.g. McGinn (1983), 11, Nagel (1986), 75, Wright (1988), 14ff. Mackie (1976) seems inclined to think that the biconditionals would be *a posteriori* if they were true.

<sup>10</sup> Like other of his unpublished ideas, Kripke’s basic views in this area have managed to get some exposure, and in several cases they clearly shape the later discussion. See Johnston (1992), 262, n. 29, Broackes (1992), 442, n. 32, Wright (2002), 402, n.1 for references to Kripke’s unpublished views.

Most of what follows (sections 2 to 4) is an attempt to summarize these Kripkean ideas, based especially on a transcript of a recording of the Michigan talk, on recordings of lectures of the 1987 seminar, and to a lesser extent on seminar notes and personal recollections. In section 5 I briefly review some recent defenses of dispositionalism about color, and I sketch some objections that could be made to them from a broadly Kripkean perspective.<sup>11</sup>

## **2. Kripke on arguments for dispositionalism and for Locke's division of the sensible qualities.**

In the first part of his critique, Kripke sought to undermine the main kinds of considerations usually adduced in favor of Lockean dispositionalism or of Locke's divide of the sensible qualities. These include: first, arguments using the possibility of intra-modal sensory inversion; second, considerations based on the thesis that secondary qualities are accessible only to one sense, whereas primary qualities are accessible to more than one sense; third, considerations based on the claim that fundamental science uses primary but not secondary qualities as primitives; and fourth, arguments based on the alleged fact that the causes of perceived color are physically diverse.

The first kind of arguments appeal to the idea that the objects that cause sensations of red in us might cause sensations of green in a race of Martians.<sup>12</sup> This is taken to imply that there is no genuine disagreement between us and the Martians when we say that ripe tomatoes are red and they say that they are green (see e.g. McGinn (1983), 9-10). Dispositionalism about color is supposed to explain this alleged relativity, for it generalizes

<sup>11</sup> Needless to say, Kripke may not agree with my claims in section 5. It is also important to emphasize that the exposition in sections 2 to 4 is very brief and sketchy due to space limitations, and does little justice to the wealth and precision of the discussion in Kripke's seminars. Besides, since the exposition is based on oral presentations by Kripke, there is a considerable risk that I have misrepresented his views at some points. However, I hope the exposition may be of some use as a rough picture of these views before they can be published in a more satisfactory way.

<sup>12</sup> In the 1987 seminar Kripke developed an original argument against the possibility of behaviorally undetectable full color spectrum inversion, that I cannot go into for lack of space. At any rate, the arguments we are examining do not require the strong assumption of such a possibility.

easily to the doctrine that, given a certain object, each population of “normal” perceivers determines a peculiar color property for it: the object is red relative to a population of perceivers in whom it is disposed to cause sensations of red, and it is green relative to a population of perceivers in whom it is disposed to cause sensations of green. Since there are similar arguments for this relativity in the case of secondary qualities quite generally, we have a similarly general argument for Lockean dispositionalism.

In reply, Kripke recalls an example from the first of Berkeley’s *Dialogues* (that he borrowed from Malebranche). Berkeley asks us to imagine a race of small creatures with suitably microscopic vision, in whose visual field objects that look, say, one foot long to us appear the way a one hundred feet long object appears to us. Kripke notes that no one would draw from this possibility the idea that size is relative, or that the property of being one foot long is dispositional. The only proper conclusion is that different organisms can have different sensations caused by the same property. But if a dispositionalist thesis about size or a distinction between the sensible qualities are not supported by Berkeley’s example, no such distinction and no dispositionalist thesis about color are supported by a color inversion example.

Considerations of the second kind have a long history, and reappear frequently in the recent literature.<sup>13</sup> Dispositionalism is a natural explanation of the alleged fact that Locke’s secondary qualities are accessible only to one sense. For it is natural to think that, say, the disposition to produce a sensation of red is only accessible to the sense which registers that sensation; on the other hand, a primary property is not defined by its effects on any particular sense, and so is presumably accessible to more than one sense, if accessible at all. But is it true that Locke’s secondary qualities are accessible only to one sense, whereas primary qualities are accessible to more than one sense? Even if it is true as a matter of fact, is it *a priori* true, as needed if it is to be used in an *a priori* argument for dispositionalism?

Kripke notes that it appears to be false even as a matter of fact. Presumably the phenomenally similar sensations that we get when we smell and taste bourbon are best seen

<sup>13</sup> See e.g. Evans (1980), 270, McGinn (1983), 8-9, Smith (1990), 241ff. Aristotle’s distinction between ‘common’ and ‘special’ sensibles in *De Anima* is sometimes cited as a precursor.

as caused by the same property. On the other hand, mass appears to be immediately accessible only to the sense of feel.<sup>14</sup> But in any case, the thesis does not seem *a priori* true. We can easily imagine red objects giving off a characteristic squeak, that we might have learnt to recognize by hearing. It is equally easily imaginable that after long correlation, our linguistic usage could have developed in such a way that we had used the word 'redness' to refer to the property that causes both the visual sensation of red and the squeaky sensation.<sup>15</sup> As far as we know, it is not true that red objects give off such a squeak. But we cannot conclude *a priori* that they do not or could not. The dispositionalist must dismiss this example claiming that, even if red objects do or could give off such a squeak, the qualities perceived by sight and by hearing when in the vicinity of a red object are or would still be different.<sup>16</sup> The problem is then how to argue for this last claim so that, say, the qualities perceived by sight when one looks at a sphere are not all different from the qualities perceived by feel when one touches the same sphere.

Obviously one cannot argue for the claim at stake by appealing to the thesis that redness and squeakiness are dispositional properties defined by reference to different sensory effects on us, on pain of begging the question. The dispositionalist may propose that the visual sensation of shape resembles the tactile sensation of shape in a way in which the visual sensation of red and the auditory squeaky sensation do not resemble each other. But it is just as hard to see any purely phenomenal resemblance in the first case as it is in the second case. The dispositionalist must claim that there is some other way to see unity in the first case and contrast in the second, a way that does not rely either on phenomenal resemblance or on the actual experience of correlation or lack of it. But it is thoroughly unclear that such a way exists.<sup>17</sup>

<sup>14</sup> We might speculate that a sixth sense is *possible* that detects mass. But we might make the same speculation about color.

<sup>15</sup> Kripke would not deny that in a sense a person who detected colors by squeaks would have a different concept of the colors. But this still does not establish the intended divide. A bat-like creature who detected shapes by hearing would in the same sense have a different concept of the shapes.

<sup>16</sup> A similar response seems mandatory in the bourbon example above; cf. Mackie (1976), 29.

<sup>17</sup> One dispositionalist line is to insist that the development of abilities of shape recognition by sight alone can lead to a kind of intuitive geometry which is the same, or *a priori* isomorphic to, a corresponding kind of

A related claim of some Lockeans and of Locke himself is that the sensations corresponding to primary qualities bear a perceptually detectable resemblance to these qualities, while the sensations corresponding to secondary qualities do not resemble anything in the object.<sup>18</sup> But it's hard to make sense of the claim that *any* quality perceptually resembles a sensation, even granting that a quality may resemble another quality in some respect and a sensation may phenomenally resemble another sensation. Furthermore, there is an easy argument against the Lockean claim that the quality of sphericity resembles both visual and tactile sensations of sphericity. Provided that the relation of resemblance at stake is transitive, as seems reasonable in the Lockean context, this claim implies that these sensations resemble each other, which is as we said hard to see.<sup>19</sup> Also the examples of phenomenal inversion or distortion, which as we just noted can be reproduced for the primary qualities, show the dubiousness of the talk of resemblance between qualities and the sensations corresponding to them.

A third important kind of traditional and recent considerations for dispositionalism and the Lockean divide of the sensible qualities rely on the claim, taken either as *a priori* or as *a posteriori*, that fundamental scientific explanations do not use Locke's secondary properties, and do use the traditionally primary properties.<sup>20</sup> For Kripke, it is very doubtful

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intuitive geometry that one can figure out through the development of abilities of shape recognition by touch alone (see Evans (1980), 269ff., and Smith (1990), 242f. for views of this sort). Even if this were true, Kripke would reply that the development of abilities of color recognition by means of different types of squeaky sounds alone can lead to an intuitive mathematical representation which is the same, or *a priori* isomorphic to, a corresponding intuitive mathematical representation of "color space" given rise to by the development of abilities of color recognition by visual sensations alone.

<sup>18</sup> Similar claims are characteristic also of some color eliminativists like Mackie (1976) and Boghossian and Velleman (1989).

<sup>19</sup> Molyneux's question is related. He asked whether a man born blind could, on recovering vision as an adult and before learning to establish any correlation by experience between sight and touch, tell by sight alone which of two objects of similar size presented to him was a sphere and which a cube (see Locke, *Essay*, II.ix.8). Significantly, Locke favored a negative answer, which goes against his view on primary qualities and resemblance.

<sup>20</sup> See e.g. McGinn (1983), 14-15, Nagel (1986), 75-76, for versions of the *a priori* claim. Smith (1990), 248ff., claims that it is *a priori* that the qualities traditionally taken as secondary are not suitable for



that such a claim is *a priori*. It does not seem *a priori* impossible that color words (and words for felt properties like warmth and coldness, or for auditory properties) could have been used in the most fundamental physics, an unimprovable physics in which they had appeared as irreducible qualities. Besides, it is in any case doubtful that even as a matter of fact the qualities that appear in fundamental science are not secondary. Kripke notes that highly fundamental levels of current physics, such as relativity theory and quantum mechanics, might be interpreted as challenges to the idea that the notion of shape that appears in them is non-dispositional. Thus, for example, special relativity implies that the shape of an object is relative to the coordinate system the observer is at rest in. And we can easily modify the famous Schrödinger's cat thought experiment so that what is quantum mechanically indeterminate in the modified scenario is whether a block of ice receives the shape of a sphere or that of a cube (depending on whether a certain particle is emitted by a source or not); at least on standard interpretations of quantum mechanics, the block of ice is neither spherical nor cubical before an observation of it has been made. And there seems to be less room for Locke's primary properties as traditionally conceived as we move to even more fundamental levels of current physics. The *a posteriori* version of the argument from fundamental science may have looked plausible to a 17<sup>th</sup> or 18<sup>th</sup> century philosopher, but it now appears far from compelling.

It is also worth noting that (currently) less fundamental but well-developed levels of science do use terms for traditionally secondary qualities without incurring any obvious error. Thus we are taught in chemistry classes that we can test for acidity and alkalinity by seeing whether litmus paper turns red or blue. And thermodynamics states a good number of laws about heat and temperature. The right picture is probably that all sensible qualities, for all we know *a priori*, can appear in different parts or levels of science, and that whether they can or not is independent of the question whether they are dispositional or not. No argument for dispositionalism or for the intended dividing line of the sensible qualities should be expected from this kind of considerations.

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science, but also says that it is not *a priori* that the qualities traditionally taken as primary are so suitable. Mackie (1976), 17ff., maintains the *a posteriori* claim.

A fourth kind of argument for Lockean dispositionalism, that has perhaps been presented only for color, is that since physics tells us that the causes of any given perceived color are diverse, objects of the same color cannot have anything in common other than that they all share a disposition to produce perceptions of that sort.<sup>21</sup> This is a purely *a posteriori* argument. Kripke was ready to concede that there could be some diversity in the causes of perceived color at some fairly fundamental level of physical description, but he doubted that this is relevant if true.<sup>22</sup> Even if the causes of color sensations turn out to be diverse to some extent according to fairly fundamental levels of physics, this would provide no argument for dispositionalism. Call a system of classification *Goodmanian* with respect to another if it classifies together things that according to the other system are quite disparate. (Compare the definition of the property of “grueness” in Goodman (1955), 74.) Even if our system of color classification is Goodmanian with respect to the systems of classification of fairly fundamental levels of physics,<sup>23</sup> this does not imply that the predicates in our system of color classification stand for Lockean dispositional properties, or even for disjunctive properties. The properties in question may well be best seen as non-dispositional within their own system of classification or even within systems of classification of not so fundamental levels of science; think again of the use of the notion of heat in thermodynamics, which is compatible with the causes of heat being diverse from

<sup>21</sup> See Hardin (1988), 1ff., for an exposition of the variety of physical causes of perceived color, which suggests to its author that “it would be in vain to suppose that objects sharing a common color resemble one another in physical structure” (4). Hardin rejects dispositionalism, but he defends color eliminativism on the basis of broadly similar subjectivist grounds.

<sup>22</sup> Still, he thought that one should examine in detail the extent to which diversity claims hold when restricted to the perceived color of objects (the primary case of application of color predicates). Like Averill (1992), Kripke conjectured that at least some of the usual examples are directly irrelevant, for they do not concern objects, and may be explained as illusions. The blue appearance of the sky has a different physical cause from that of a blueberry, but it may be just as illusory as the appearance that “the sky” has the shape of a vault.

<sup>23</sup> Kripke noted several respects in which our color perception system is Goodmanian with respect to the presumable underlying physics, respects that can be discerned without much specialized knowledge. For example, our perception system imposes radical phenomenal breaks on the continuum of light wavelengths.

the point of view of more fundamental levels of physical description.<sup>24,25</sup> (Recall that Kripke's "fixes a reference" view of footnote 71 in *Naming and Necessity* was explicitly consistent with the properties in question being taken from non-fundamental levels of physics.) As noted above, presumably many or all predicates for sensible qualities fail to appear as usually understood in the system of classification of fundamental levels of current physics, which makes our system of classification of primary qualities Goodmanian also on these grounds. But this is no reason to adopt a dispositionalist view of the traditionally primary qualities, as understood within comparatively more rudimentary systems of classification.

### **3. Kripke on color words in natural language.**

According to Lockean dispositionalists, redness is *a priori* radically different from a natural kind or substance like gold. As McGinn puts it, "we cannot envisage cases in which the identity of a given colour comes apart from its appearance—there cannot be 'fool's red' as there can be fool's gold" ((1983), 13). (Strictly speaking, as noted above, modern dispositionalists postulate that it is *a priori* that there cannot be fool's red "for normal humans under normal conditions".)

Kripke notes a tension in this dispositionalist view. If one is allowed to use qualifications of this sort, then one can presumably equally hold that there cannot be fool's gold for normal humans under certain conditions. There seems to be no obstacle to the idea

<sup>24</sup> Though thermodynamics does not seem to be too Goodmanian with respect to the "next" level of physics, statistical mechanics.

<sup>25</sup> Kripke often noted, however, that color science is far from having reached the reasonably definitive results that might turn it into an established though non-fundamental part of physics, in the style of thermodynamics. The relevant scientific work about color is not all in yet. Among some of the polemics and surprising disagreements he mentioned the fact that some books assert that three appropriately chosen color lights ("primaries") can be mixed (in different intensities) to obtain a color match for any arbitrary light, but others, presumably correctly, deny this. See e.g. Feynman, Leighton and Sands (1963), 35-3, where the truth is said to be that for every such trio there will be some color light that can only be obtained from the trio in the sense that, when mixed with one of the chosen primaries, it matches the mixing of the other two. In any case, Kripke thought it extremely implausible that science would in the long run embrace dispositionalism or eliminativism about color.

that if one can specify these conditions in the color case, then one can specify them in the gold or sphericity case. Thus the dispositionalist is led to hold that, even if we can specify both the cases where we will not be fooled about redness and the cases where we will not be fooled about gold or sphericity, only in the redness case can we reach that specification *a priori*. The problem then, Kripke objects, is that “normal humans” and “normal conditions” in the redness case must be specifiable in advance of any relevant empirical discovery; the dispositionalist cannot appeal to empirical findings when drawing up his list. But even the list of known cases where we actually distinguish between apparent and real color could hardly have been drawn in advance. Some of these cases will be mentioned in section 4 below.

The dispositionalist rejects the idea, embraced in *Naming and Necessity*, that color terms are much like terms for natural kinds, substances or phenomena. He thinks that it is even *a priori* that ‘redness’ is not a natural kind term. Now, by this he does not mean that in the case of a natural kind you can be fooled without making any gross mistake in perceptual judgment, but you cannot be fooled in the case of red. Certainly you cannot be fooled about perceptual judgment in either case, unless you call perceptual judgments things of the form “this is gold”. But if so, you should call perceptual judgments things of the form “this is red”, and you can be fooled about these. What the dispositionalist must mean is that if something looks red to us, then no amount of saying that it is just totally unlike the other things that are red will have any force against the judgment that it is red. In the case of gold, the dispositionalist accepts Kripke’s view that the reference of ‘gold’ is fixed by ‘the substance instantiated by the items over there, or at any rate, by almost all of them’. Given that we have found out that there is indeed a substance instantiated by most of the things paradigmatically called ‘gold’, we are content to classify the exceptional things that look like gold but differ from it in more subtle properties as not being really gold. But no such thing can happen with ‘red’ according to the dispositionalist.

It is important not to confuse what is (allegedly) the scientific truth about color with the way color terms function in natural language. As we have seen, a view sometimes

derived from science is that red things do not have much in common.<sup>26</sup> Even if this were so, it would not mean that color terms are not like natural kind terms in the relevant respect. The important question is: if almost all the red things *had* enough in common, would there be a pressure to classify some exceptional things that looked red but differed from the other things in more subtle properties as not being really red? Intuitively, the answer is yes. The (alleged) empirical fact that paradigmatically red things do not have much in common does not show that ‘red’ is not a natural kind term<sup>27</sup>, just as the discovery that paradigmatic cases of gold did not have much in common would not have shown that ‘gold’ is not a natural kind term.

Beliefs such as the belief that most paradigmatic cases of gold belong to a single substance, or that most paradigmatically red things share a certain non-dispositional property, are examples of what Kripke calls *prejudices*. Although not *a priori*, a prejudice is a belief that we hold onto pretty firmly, and that we try to retain with as little modification as possible in the face of pressures from empirical data. For Kripke, our language is replete with working prejudices. Many of them have a semantic role, though not the role of an analytic definition. One semantic role of the belief that most paradigmatic cases of gold belong to a single substance is that of setting a condition for the assignment of an extension to ‘gold’, in case the prejudice is true. If we find out that it is not true, the semantics we give to ‘gold’ will depend to a great extent on our new decisions in view of the empirical data, and one semantic role of the relevant remaining prejudices will be to guide these decisions. A similar thing happens with ‘red’. If the prejudice that most paradigmatically red things share a certain non-dispositional property turns out to be empirically false, this may eventually incline us to make some new semantic decisions, perhaps to choose an extension for the term guiding ourselves by other prejudices such as those mentioned below. (Of course, on Kripke’s view any such inclination in the case of color is totally premature at this moment.)

<sup>26</sup> It should be mentioned that the view is by no means universal or even majoritarian. A good many authors propose realist physicalist theories of various kinds which see a unity in the red things. See e.g. Byrne and Hilbert (1997), Hilbert (1987), Jackson (1996).

<sup>27</sup> As we will see, Kripke’s ultimate view is that ‘red’ is not exactly a natural kind term. He just wants to note that a certain argument against the view that it is a natural kind term is flawed.

Two other examples of prejudices spotted by Kripke, and highly relevant in the discussion about the primary/secondary quality distinction, involve the notion of solidity. A. S. Eddington said that science has shown that a table is not really solid because there are big gaps in it, and Susan Stebbing replied that tables are paradigmatic cases of solidity. (See Eddington (1928), 1ff., and Stebbing (1937), 51ff.) Both can be seen as relying on prejudices. Stebbing relies on the prejudice that (most) paradigmatic instances of application of a predicate are indeed instances of the predicate. Eddington relies on the prejudice that if something is really solid then it does not have gaps. This latter belief strikes some as analytic or quasi-analytic, but one indication that it isn't is presumably that people like Stebbing want to claim that ordinary objects are solid and yet are full of gaps.

There are many other prejudices that we have about colors, besides the mentioned prejudice that most paradigmatically red things share a certain non-dispositional property. One is analogous to Stebbing's paradigmatic prejudice: (most) paradigmatic instances of a color predicate are indeed instances—the grass is green, lemons are yellow, English pillar boxes are red. Another prejudice is the famous color incompatibility principle, as applied to red and green, say: something cannot be both red and green all over.<sup>28</sup> Yet another prejudice, related to the incompatibility principle, is analogous to Eddington's "no gaps" prejudice; it's the so-called principle of the dissectiveness of color, as applied to yellow, say: if something is yellow all over, then all its ordinary parts are yellow. (Or at least: if something is yellow all over, then all its ordinary parts are not colored and with some color incompatible with its being yellow.) The dissectiveness principle may or may not be true, but it is certainly a strong prejudice, and in fact it seems to be by and large valid.<sup>29</sup>

Another prejudice about color is the belief that every normal opaque object must have a color. Kripke acknowledged that this prejudice confers to color words a functioning different from that of pure natural kind terms. If something had little in common with most red things *but* we had no reason to call it other than red, we would have a strong pressure to

<sup>28</sup> For Kripke there is no reason in principle why an object could not be both red and green all over, since the properties that cause red and green impressions in paradigmatic circumstances may turn out to be co-instantiable. What does seem impossible in principle is that an object can look both red and green all over.

<sup>29</sup> Armstrong (1961), 162-163, accepts the principle (see also Armstrong (1969)). Hilbert (1987), ch. 2, rejects it. The name 'dissective' comes from Goodman (1951).

give it some color, and with further pressure from the paradigms prejudice, probably the red color that it appears to have.<sup>30</sup> Note, however, that while we feel embarrassed to count a normal opaque object as having no color at all, the dispositionalist theory is compatible with the claim that some objects are colorless: in order to be colorless, an object must simply fail to be observable under normal conditions, or fail to produce a sensation of color under normal conditions (perfectly imaginable possibilities, as we will see in section 4). So the dispositionalist theory is in tension with this prejudice.<sup>31</sup>

Kripke's methodology postulates that there is a rough procedure that we follow as members of a linguistic community, and which consists in that we try to preserve as many prejudices as possible, and with as little modification as possible, in the face of conflicts with empirical data. What prejudices about a certain term are modified and to what extent is dictated by the relative frequencies and strengths of the empirical conflicts that arise between the different prejudices. Most of the examples in the next section are designed both as counterexamples to the thesis that the specification of "normal conditions" needed by the dispositionalist can be done *a priori*, and as thought tests for the hypothesis that we apply the procedure just roughly described.

<sup>30</sup> Kripke also noted that an obvious difference between the sensible qualities and natural kinds is that, while something cannot look red or spherical and not be red or spherical *if the senses are not deceiving us*, something may look like gold and not be gold without any sense deception. Yet another difference is that, if most tables were gappy but a few had turned out to be gap-free, we would have been inclined to call the latter solid; if most paradigmatic instances of a natural kind term turn out to have nothing in common, it seems we are more likely to withdraw the term.

<sup>31</sup> Kripke also emphasized a difference between color terms and terms generally agreed to express dispositional properties, such as 'nauseating', 'sexy' or 'painful' (as a predicate of objects such as a torture instrument). In the case of color, we say that the observers that the dispositionalists exclude as abnormal, such as the color-blind, are in error when they make certain color judgments. In the case of 'sexy', e.g., we don't say that the people who deviate from the norm, such as the shoe fetishist who finds shoes sexy, are in error; we just call them exceptional cases. If color words are purely dispositional terms, why don't we call the color-blind merely exceptional cases? The fact that we don't speaks against the dispositional view.

#### 4. Some of Kripke's counterexamples to Lockean dispositionalism.

##### *Modal considerations*

On McGinn's and other dispositionalist views, the equivalence between being red and looking red (to normal observers under normal conditions) is not just *a priori* but metaphysically necessary, so these views imply that if humans had been so physically constituted that lemons had looked red to them, lemons would have been red (see e.g. McGinn (1983), 13, n.12). Kripke's view of 'yellowness' as a rigid term implies that in the world described by McGinn lemons would still be yellow (provided 'yellowness' refers), and Kripke noted that we do have the intuition that lemons would still be yellow (though they would look red).<sup>32</sup> This is thus a modal counterexample to a number of dispositionalist views, analogous to the modal counterexamples of *Naming and Necessity* against some descriptivist theories.

Nagel (1983) and Shoemaker ((1986), 410-411), though agreeing with McGinn that being red and looking red are actually (and *a priori*) coextensional, concur with Kripke's modal intuition and propose "rigidifying" repairs of the dispositionalist view. Nagel's repair consists in proposing that being red is, in all possible worlds, the property of looking red to us in the actual world. This is clearly defective, as it implies that a piece of litmus paper that is dipped in an acid in the actual world and dipped in an alkali in a counterfactual world is red in the counterfactual world. On Shoemaker's fix, redness is "the disjunction of all those properties, actual and possible, whose instantiation would produce (under certain circumstances) [experiences of red] in creatures constituted as we in fact are" (*ibid.*, 410). This seems to fix the modal problem above, but it does not go well with Shoemaker's intuition that being red and looking red are *a priori* coextensional. Note, for example, that Shoemaker's theory is *a priori* consistent with the negation of the color incompatibility principle, but the principle is *a priori* if being red and looking red are *a priori* coextensional; also, an object's possessing one of the properties in the disjunction is not *a priori* incompatible with its also having an interfering property that makes the object

<sup>32</sup> McGinn, *ibid.*, claims to have the opposite intuition, but it's hard to avoid thinking that he is in the grip of his own theory. He sticks to this view in (1996), where he proposes a different analysis of the color properties which is nevertheless necessarily coextensional with his old analysis.



look yellow (such as the property discussed in the jaundice example of the next subsection).

The examples in the remainder of this section play a part analogous to the “epistemic” examples of *Naming and Necessity*. They are all examples involving situations that are either plainly true or not *a priori* excludable as true in the actual world. Thus they apply even to dispositionalist theories that postulate that the equivalence between being red and looking red is not necessary but merely *a priori* true of the actual world.

*Killer intensities, faint intensities, and the jaundice*

The surface of the sun is very hot. This is not a sophisticated result of science, but something that we believe on the basis of very modest inferences. On a Lockean dispositionalist theory, to be hot is to be disposed to produce a certain sensation of heat, in normal humans under normal conditions, and to get hotter and hotter is to become disposed to produce it in higher and higher intensity. To be very hot is then to be disposed to produce a sensation of great heat in normal humans under normal conditions. And then, if the surface of the sun is very hot, the surface of the sun must produce a sensation of great heat in normal humans under normal conditions. But the surface of the sun does not produce any such sensation in humans, because any human would be disintegrated instantly if he were put in the position of feeling any such thing. Thus, whether the dispositionalist postulates that being near the surface of the sun is a normal or an abnormal condition, he must say that the surface of the sun is not very hot after all. (Recall the modified biconditional of section 1 above.)

Similarly, there are very loud sounds, so loud that they produce deafness as soon as one is put in a position to hear them. The dispositionalist has a problem again here, for on his theory loudness is supposed to be a disposition to produce loud auditory sensations, and louder and louder sounds are those that produce more and more intense auditory sensations of loudness. His theory has the consequence that there aren't any deafening sounds.

By analogy with killer heat and deafening sound, Kripke notes that it is imaginable that there could be (and perhaps there are) killer or blinding shades of some color. Besides the dimension of hue, the perceived colors of objects vary along the dimensions of saturation and brightness. (Saturation is proportional to the strength of a given hue, with

more saturated colors being more vivid. Brightness is proportional to the amount of light that the object seems to reflect, with lighter colors seeming closer to white.) One could well imagine that greater degrees of saturation of a color, or especially greater degrees of brightness, tended to kill us or to drive us blind. We might even see this effect coming as we saw the variation along the continua of hue strength or of apparently reflected light. The idea that an object is red but so very vividly red or so very bright red that we could never see it is far from unintelligible. The possibility of a color that does not produce sensations in us arises also as we consider other processes that give rise to a continuous variation in colors, for example the mixture of two dyes. It is imaginable, for example, that two dyes mixed in different proportions give rise to different shades of blue, but one shade of blue along the continuum is permanently missing, because people looking at objects of that shade get killed or are driven blind. These objects would not produce any sensory effects and so would not be red, nor blue, etc.<sup>33</sup>

The dispositionalist also has a problem in the case of very low sounds, so very low that most humans under most conditions don't hear them. There are all sorts of reasons to accept the existence of such sounds (some to be mentioned shortly), but the dispositionalist must reject it, if he is committed to the equivalence between being very low and producing a sensation of being very low in normal humans under normal conditions. For most humans under most conditions just won't get any such sensation. Also, there arguably are colors that do not produce any differential sensation in most of us under most conditions. As we decrease the saturation of a certain red paint, putting more and more white into it, the paint will look more and more pink. But at some point it will look white to most of us in most conditions in spite of the fact that the color is not pure white. Here we would have grounds for calling the paint pink, even if it looks white. But the dispositionalist must reject this, if he is committed to the equivalence between being pink and looking pink to normal humans under normal conditions. The only premise required is that most humans are normal and

<sup>33</sup> Note that it is hard to see how the mere fact of listening to a deafening sound or looking at a killer red object could be declared abnormal conditions of observation—though even if this ad hoc declaration is made, these cases provide counterexamples to dispositionalism.

most conditions under which we look at such a paint are normal, which seems even analytic.

A somewhat different kind of case imagined by Kripke, where we would also be inclined to say that some objects have a certain color but do not look that color, is the following. On Berkeley's (wrong) conception of the jaundice, its sufferers see everything yellow (in fact, it's their skin that becomes yellowish). Suppose Berkeleyan jaundice is produced by a very toxic substance. If a normal human is in direct contact with a bar of this substance and takes a look, it will waft onto his face and give him the jaundice, making everything look yellow to him. (This is how one normally observes these jaundice-producing bars, or any ordinary object for that matter.) However, there might be good reasons for calling the bar itself red. For example, a color picture is taken of the scene, in which everything appears with its expected color, and the bar appears red; further, we also know that it was made with dyes that mix to produce red; we know through a measuring apparatus that it reflects mostly light of long wavelength, etc. Perhaps the fact that every object looks yellow to the jaundice sufferer might give some grounds for calling this an abnormal condition. (In few circumstances does everything look yellow.) But we can further imagine that the effect of the substance is differential and it just affects the eyes in that only things near the substance, or even only the substance, looks yellow.

An interesting aspect of many of these examples and others devised by Kripke is what one would be inclined to say about them if we add the further supposition that there are exceptional people who appear not to be subject to the problem or appear to be much better than normal humans at detecting quality intensities and differences among them. People of this sort certainly exist who seem especially able to detect faint sounds and highly desaturated colors, for example. They are a minority, however, so they cannot constitute the class of normal humans that a dispositionalist mentions in his theory—the normal people must be a majority. Still, the intuitive view is that these people have a better perception of sound or color. Their judgments are respected, and we have reasons for respecting them, both sophisticated and crude. But according to a dispositionalist view, their judgments must be irrelevant. (Averill (1982) makes similar points.)

In all these cases, there is no special problem from the point of view of the Kripkean methodology described at the end of the last section. In the cases of heat, sound and color

we have analogous prejudices to the effect that the heat intensities, sound properties and color shades are not Lockean dispositional properties, but non-subjective properties “out there”. This is consistent with some of them not being detectable, and with some of them being detectable only by especially gifted perceivers, even if they are only a minority. The dispositionalist theory, on the other hand, is in tension with our intuitive judgments about the cases described.

*The analogy between yellowness and solidity*

A case where the Kripkean methodology can be more substantively applied to explain our intuitions is provided by certain cases of color mixture. It is well-known that in some cases an object that is perceived as yellow from a certain distance can in fact be seen to be composed of red and green parts (and no yellow part) when looked from closer up. Examples are patches of some pointillist paintings, of television screens, and of real-life mountains.<sup>34</sup> This is very striking, because yellow seems to have no phenomenal connection to red or green.

Kripke emphasizes the close relation of these examples to analogous examples involving the notion of solidity. An object which has lots of gaps in it may look solid from a distance and gappy from closer up. The basic reaction to both kinds of examples is to think, with pressure from the dissection prejudice and the “no gaps” prejudice and in the absence of pressures against them from the paradigm prejudices, that the apparently yellow object is in fact red and green, and the apparently solid object is in fact gappy. Both cases would be cases of illusion: there is so much mixing that we can’t distinguish from a sufficiently long distance the red and the green parts (or the solid parts and the gaps), but the object is red and green (or gappy).

(Kripke noted that in some contexts of description of cases like these we are primarily interested in appearances or phenomenal effects, and we speak as if things were as they appear. This happens when we are interested in aesthetic effects, for example. Thus,

<sup>34</sup> A related classical example is provided by things like blood, which looks red all over from a normal distance but looks red with transparent gaps under the microscope. (See e.g. Berkeley, *Dialogues I*; Armstrong (1969); Hilbert (1987), ch. 2.) However, this is different from the examples in the text in that microscope observation is not a paradigmatic circumstance, while observation from close up certainly is.

looking at a pointillist painting, we may speak of the contrast between the golden field and the blue sky, even if the field is seen not to be really golden on closer inspection. We also say things like “The lights were switched off and all went black”. There is similar talk involving traditionally primary qualities. The Parthenon has pillars of unequal heights that appear of equal height, and we describe them as equal if we are primarily interested in the aesthetic effect. We also say things like “She walked toward the horizon until she was only a dot”. The existence of these contexts does not invalidate the thought that the field is really a mosaic of red and green and the pillars of the Parthenon are really of unequal height, which is the appropriate description in stricter contexts.)

The methodology hypothesized by Kripke gives a more sophisticated prediction in cases where there arise conflicts between the different prejudices. Think first of an imaginary case in which most ordinary paradigmatic solid objects had turned out to be composed of continuous matter without any gaps, but a few exceptional trick objects produced in the laboratory (and sometimes used by magicians) were composed of discrete molecules with very small gaps between them, undetectable with the naked eye. Both the objects made of continuous matter and the gappy objects would look solid. In this case, given that the gappy objects would be relatively few, we would be happy to say that they are not really solid, that they are cases of “fool’s solid”. This imaginary case is to be contrasted with what has turned out to be the real case according to current science, namely that all ordinary objects are gappy. In the real case, given that the “no gaps” prejudice has turned out to be in such a large scale conflict with experience, the pressure from the paradigms prejudice is strong and may prevail, as we may not want to deny that paradigmatically solid objects are solid.

The case of yellow is analogous. If it had turned out to be the case that all or most ordinary yellow things were seen on closer examination to be composed of red and green parts, then the paradigms prejudice would perhaps have won, as we may not want to deny that paradigmatically yellow objects are yellow. However, it seems that most things that we call yellow are not composed of red and green parts. If this is true, then the existence of relatively few apparently yellow objects that are in fact composed of red and green parts does not create too much pressure for the dissectiveness principle. This principle can be

retained, provided just that we are ready to call the exceptional objects cases of “fool’s yellow”.

What one would say about ‘solid’ and ‘yellow’ is thus similar to what one would say about ‘gold’ in analogous cases. In particular, the existence of a relatively small class of objects in the paradigmatic sample that fail to satisfy a certain general prejudice about the sample is only a motive for distinguishing between basic cases and exceptional, or “fool’s” cases. Another similarity is that in all these cases contingent facts of our history can affect what is regarded as paradigmatic and what is not. Thus, for example, patches in color television screens would presumably not be regarded as paradigmatic as things are now, but perhaps they would be so regarded if most people were permanently in front of television screens. Just as with the reference of ‘Madagascar’ in the proper name case (cf. Evans (1974)), the paradigmatic sample that helps fix the reference of ‘yellowness’ may vary if the things that most people in the linguistic community are acquainted with vary.

### *Color illusions*

One prejudice about color not mentioned earlier is that not only is color a manifest property of the object, but it is not relative to its state of motion or rest with respect to an observer: if the object doesn’t change its intrinsic properties, it will not change color merely because it starts moving with respect to the observer. But the so-called Benham disk, which contains only a black and white pattern, looks multi-colored when it rotates at certain speeds. (The Benham and other disks that produce “subjective colors” are similar to the case of a fan that may appear solid, with no gaps, if it rotates fast enough.) Related illusions occur in cases where the object is stationary relative to the observer. The Butterfield television encoder creates the appearance of certain colors using a set of pulsed black and white signals. Even some stationary, non-pulsating black and white patterns create a color appearance if one stares at them for some time, apparently due to eye motions (see e.g. Hardin (1988), 72ff). In all these cases the objects appear to have certain colors to normal observers under what seem to be normal conditions, and yet they really stay black and white (so say the prejudices mentioned above). (Averill (1982) also uses similar examples against dispositionalism.)

Another relevant type of illusions are the so-called simultaneous contrast illusions. In these, colored patches of some material dyed with one and the same pigment are placed in the center of bigger patches dyed with a variety of other pigments. The perceived color of the smaller patches then varies, sometimes greatly, depending on the color of the bigger patch that surrounds them (see e.g. Hardin (1988), 49 and plate 2). We certainly have the prejudice that two patches dyed with the same pigment cannot be of different colors, and in particular that their color doesn't change with a change in their backgrounds. This implies that the smaller patches are of the same color, even if they look different against their backgrounds. It is hard to think how these cases could have been declared abnormal *a priori*. In fact, it is hard to see how they could be specified without restricting normal conditions excessively (simultaneous contrasts are ubiquitous), or without presupposing that background patches have a color independently of how they appear. Similar illusions occur in the domain of Locke's primary qualities. Take the well-known Müller-Lyer illusion, where two arrows of equal length look like they have different lengths because arrow-tails with different orientations are placed at their ends. The existence of this illusion could hardly have been predicted *a priori*, but it seems analogous in all relevant respects to the simultaneous contrast illusions. In both cases our intuition is that there is a distinction between the real and the apparent quality even under normal conditions, against dispositionalism.

## **5. Remarks on some recent defenses of Lockean dispositionalism.**

*Unaltered, unmasked, standardly mediated and relativized dispositions*

Johnston (1992) has proposed to weaken the right-hand side of dispositionalist biconditionals by, essentially, adding new conditions of an abstract nature to the antecedent of the counterfactual, conditions of which it may not be implausible to think as *a priori* required.<sup>35</sup> In particular, Johnston distinguishes three types of cases in which

<sup>35</sup> See Johnston (1992), 229-230, for his version of the apriority requirement. It must be mentioned that Johnston presents his defense of dispositionalism merely as a defense of the claim that it accommodates a greater number of common beliefs about color than realist views; for him, the set of all common beliefs about color is inconsistent. It must also be said that in more recent work (1998) he has distanced himself from dispositionalism, though on grounds different from those to be given here.

counterfactuals such as those featured in the right-hand side of typical dispositionalist biconditionals are true, but we are not inclined to take this as a sign that the corresponding postulated disposition has really manifested itself; and he proposes to modify the dispositionalist analysis by excluding those cases. In the first type of case, that of “mimicked dispositions”, something extrinsic to the object and the normal conditions of observation is the cause of a color sensation, including possibly a type of sensation that would have been produced by the object if left alone. (Example: “There might have been a ray emitted from the center of green objects, a ray which acted directly on our visual cortices so that green objects always would look red to us” (*ibid.*, 231).) In the second type of case, that of “altered dispositions”, there are extrinsic properties of the object which cause it to change intrinsically before conditions become normal, and these changes cause a color sensation that would not have been produced without them. (Example: the skin of “a shy but powerfully intuitive chameleon which in the dark was green but also would intuit when it was about to be put in a viewing condition and would instantaneously blush bright red as a result” (*ibid.*, 231).) In the third type of case, that of “masked dispositions”, something extrinsic to the object and the normal conditions of observation is the cause of a color sensation that would not have been produced by the object otherwise. (This is just a special case of the first case, and the ray example is one of a masked disposition as well.) A proposal that takes care of these cases is, then: “an object is green iff (it can be observed by normal humans under normal conditions and there are intrinsic features of it that, in normal humans, under normal conditions, and masking, altering and mimicking aside, would produce sensations of green)” (cf. Johnston (1992), 234; but this is not Johnston’s final proposal).

All the counterexamples of section 4 continue to work against this proposal, except for one construal of the jaundice example.<sup>36</sup> In the killer cases, there isn’t even any masking, altered or mimicked sensation taking place; but more generally, in the killer and faint intensities cases there isn’t anything extrinsic to the object and the normal conditions of observation that is responsible for the absence of the appropriate sensation. The same

<sup>36</sup> It may be useful to point this out, as some philosophers in conversation have told me that a proposal of this sort took care of the word-of-mouth version of Kripke’s counterexamples that had reached them.



can be said of cases of color mixture: the red and green field in the pointillist painting, say, produces a yellow sensation without any masking interference from elements extrinsic to the object or the normal conditions of observation. The Benham disk and related illusions equally do not seem to involve the operation of any extrinsic cause. The case of simultaneous contrast illusions may be *prima facie* less clear, but it is also unaffected; it might be claimed that the background patch is extrinsic to the smaller patch and masks its disposition to look its real color, but the background patch as such is certainly not extrinsic to the normal conditions of observation; in fact, simultaneous contrast effects occur continuously in nearly all conditions of observation (only observation with the help of a dark reduction screen—hardly a normal condition—will avoid completely these effects). Finally, if the jaundice producing substance produces the jaundice because some virus is attached to it, then we may perhaps suppose that the virus is something extrinsic that masks the disposition of the substance to look red: the substance is red, but the proposed analysis of this color ascription is not false. However, we still get a counterexample if we alternatively suppose that the yellow sensation is produced by some poisonous intrinsic chemical feature of the substance itself. (Note that the killer cases provide counterexamples to the “only if” direction of the biconditionals for the killer properties. The faint intensities, color mixture, color illusions and “intrinsic” jaundice examples provide counterexamples both to the “only if” direction of the biconditionals for the real properties and to the “if” direction of the biconditionals for the apparent properties.)

Johnston’s reaction to examples like the “intrinsic” version of the jaundice is to introduce the further condition that “the processes which mediate the relevant dispositions to produce color appearances be among the processes which are standard or typical when it comes to seeing color” (Johnston (1992), 245). A dispositionalist account might incorporate this condition thus: “an object is yellow iff (it can be observed by normal humans under normal conditions through normal mediating processes and there are intrinsic features of it that, in normal humans, under normal conditions, through normal mediating processes, and masking, altering and mimicking aside, would produce sensations of green)”. The “intrinsic” version of the jaundice is no longer a counterexample to the “if” direction of this biconditional for yellow, provided we count the process by which the jaundice bar produces the sensation of yellow as atypical; as Johnston would put it, this

kind of dispositionalist need not count the bar as yellow. However, the “intrinsic” jaundice is still a counterexample to the “only if” direction of the biconditional for red: given that the bar cannot be observed through normal mediating processes, the biconditional implies that the bar is not red. Note also that the relevantly analogous biconditionals imply that the surface of the sun is not very hot, that there aren’t any (inaudibly) loud or soft sounds, that no objects are killer blue, etc., whether we count the corresponding processes as normal or not.

The new proposal also fails to take care of simultaneous contrast illusions. The requirement that dispositions be normally mediated disposes perhaps of the Benham disk and related counterexamples; as Johnston notes, the processes which mediate the illusory color sensations in these cases can be reasonably called atypical, for they are processes in which packets of different kinds of light come to the eye in very swift sequence from the same location, and this is unusual. But in the simultaneous contrast illusions we cannot speak of an atypical mediating process. As noted above, simultaneous contrast effects are ubiquitous.

In order to deal with color mixture examples, Johnston considers approvingly the possibility of relativizing color ascriptions. The ground for this is that it seems reasonable to say that “for many or all of the things we take to be colored there are no standard perceivers nor standard viewing conditions”, which suggests that “the best we can do [may be to] talk about the color relative to this kind of perceiver or that kind of viewing condition” (Johnston (1992), 230-231; later (p. 248), he seems to envisage the possibility of relativizing color also to kinds of mediating processes). Applied to the mixture cases, this relativizing maneuver postulates that “the field in the pointillist painting *is* golden when viewed from two yards”, not absolutely, and that an *analysans* of this ascription will always contain “when viewed from two yards” as a part of what is substituted for “under normal conditions”. However, although it seems reasonable to say that viewing the pointillist painting from a distance of two yards and viewing it from much closer up are equally “normal” viewing conditions, this idea does not intuitively incline us, even when faced with the mixture examples, to relativize color ascriptions or an antecedently tempting dispositionalist account of them. Rather, we stick to color absolutism and we accept at most

that, strictly speaking, the field *looks* golden when viewed from two yards.<sup>37</sup> As things are, we will simply say that the field is really red and green, perhaps because we implicitly accept an intuitive version of the dissection prejudice.<sup>38</sup> Kripke's account explains these intuitions, and is thus preferable to a relativist dispositionalism as an account of our color concepts.

### *Color similarities*

A frequent argument against objectivist views of color, such as Kripke's view, is based on the observation that we intuitively accept similarity and dissimilarity claims about colors. For example, we naturally say that blue is more similar to green than it is to red, or that canary yellow is not as similar to the shades of blue as these are among themselves (an example of Johnston (1992), 236). However, the argument continues, it might turn out that

<sup>37</sup> The use of relativization to try to avoid other Kripkean counterexamples seems even more difficult to motivate by appeal to intuitive claims about what is normal or not. There are no actual (and perhaps no possible) observers or conditions in which the surface of the sun produces suitable sensations of great heat, so it is certainly not on relativistic grounds that we speak of the surface of the sun as very hot. We intuitively think of the surface of the sun as very hot—and of the killer blue objects as killer blue—in an absolute sense, and on grounds quite independent of any additional speculation about possible conditions and observers in which they would produce suitable sensations. Relativization is also poorly endowed to deal with our intuitions about simultaneous contrast illusions. There is a clear intuitive sense in which the smaller patch has an absolute color property independently of changes in its background (especially if we choose the smaller patch so that by itself it reflects only one kind of unmixed light), but relativization to a background does not single out any such privileged sense.

<sup>38</sup> Kripke also notes that if most paradigmatic surfaces that look yellow were composed of red and green parts, we would perhaps not be so determined to say that the field is not golden. Suppose this became the case, perhaps because most colored objects viewed by humans ended up being patches of television screens. Then we would probably accept that the pointillist field is golden, and also that it *looks* golden when viewed from two yards and *looks* red and green when viewed from much closer up, and perhaps *also* that it *is* red and green. But not even in this case would we say, I think, that it *is* golden (but not red and green) when viewed from two yards and it *is* red and green (but not golden) when looked from much closer up. (Of course we may talk this way in some occasions such as those noted by Kripke, in which we are primarily interested in aesthetic or related effects. It may be equally acceptable to say rhetorically that “the table is solid for the common man”, even if we know that properly speaking it is not solid in an absolute sense.)

science ends up concluding that the manifest property that causes sensations of canary yellow is as similar to the manifest properties that cause sensations of the shades of blue as these latter properties are among themselves; it might even discover that the manifest property of canary yellowness is more similar to some of the manifest blueness properties than these are among themselves.<sup>39</sup> These are certainly possibilities left open by realist accounts. But it would seem that claims such as the claim that canary yellow is not as similar to the shades of blue as they are among themselves are not open to scientific refutation.<sup>40</sup> In Johnston's words, "we take ourselves to know these principles just on the basis of visual experience and ordinary grasp of color language" (Johnston (1992), 237; for similar arguments see also Boghossian and Velleman (1991), 85ff., and Maund (1995), 146).

Johnston has claimed that this type of consideration strongly supports dispositionalism. The idea is that dispositionalism is not consistent with the possibility that canary yellow is not as similar to the blues as these are among themselves, because the disposition to produce sensations of canary yellow is not as similar to the dispositions to produce sensations of the shades of blue as these dispositions are among themselves. The dispositions to produce sensations of the shades of blue are similar among themselves because the sensations corresponding to the different shades of blue are similar among themselves. And the disposition to produce sensations of canary yellow is not comparably similar to these, just because sensations of yellow are not as similar to sensations of blue as these are among themselves. Since these principles about the similarity and dissimilarity of

<sup>39</sup> As Byrne (2003), 642, n. 5, notes, similarity arguments assume, not implausibly, that "if [objectivism] about color is true, then any genuine respects of similarity between the colors will be evident at the level of the canonical [scientific] description of those properties". (Some kind of objectivist might propose that the sensation it produces is a way of epistemic access to the manifest property of yellowness, but this would be odd.)

<sup>40</sup> Gold (1999), 37ff., makes an attempt to argue that science could in fact discover that canary yellow looks more similar to certain laboratory produced appearances of yellowish shades of blue than the shades of blue in general look among themselves. If this is right, it's nevertheless unclear that the dispositionalist could not simply switch to less controversial examples, such as the judgment that blue resembles green more than red.

sensations are justified just on the basis of visual experience, dispositionalism is supported by our intuitive judgments of similarity and dissimilarity among the colors.<sup>41</sup>

There is no doubt that we do make intuitive claims of color similarity and dissimilarity, and that the apparent justification for these claims we make is visual experience. What is not so clear is that this supports dispositionalism in any way, for comparable similarity claims, also apparently justified on purely visual grounds, are naturally made about traditionally primary qualities. Think of the shape of an orange, which though roughly spherical is in fact highly irregular. It is nevertheless natural for us to say that the shapes of oranges are similar to that of a sphere, that the shape of a sphere is more similar to the shapes of oranges than it is to the shape of a certain highly compressed but regular ellipsoid. It is also natural to say that science could not refute these judgments made on purely visual grounds. How should these claims be viewed? By itself, the dissimilarity claim certainly does not incline us toward a dispositionalism about shape; uncontroversially, the stable intuitive view of shapes is that they are non-dispositional properties. But the *prima facie* impression that the dissimilarity claim is not open to scientific refutation equally fails to support dispositionalism. After a moment's thought it becomes clear that it is part of the stable common beliefs about shapes that the geometer can find similarities that are not justified on purely visual grounds. (At any rate, if this is not part of a thoroughly unsophisticated common conception of shape, it is at least part of a more sophisticated but still common conception. And it is certainly part of the dispositionalist's view that science can overturn intuitive judgments that the common man makes about the primary qualities purely on the basis of his sensory experience of them.) And in fact the geometer tells us that the ellipsoidal shape is genuinely more similar to the

<sup>41</sup> Surely the manifest property of canary yellowness (if it exists) is not as similar to the manifest blueness properties as these are among themselves, in that that property produces sensations that are not as phenomenally similar to the sensations produced by the latter properties as these sensations are among themselves. But the existence of these properties and their effects is not justifiable merely on the basis of visual experience and ordinary grasp of color language. The existence of a disposition to produce the same effects is supposed to be so justifiable (Johnston (1992), 242). Although I find this latter claim dubious, it can be granted for the sake of argument.

spherical shape than to the shapes of the oranges.<sup>42</sup> So it is clear after a moderate amount of reflection that, if the intuitive dissimilarity claim is meant as a claim about shape properties, then it is upset by science and does not receive an adequate ground from pure visual experience. This shows that natural claims of dissimilarity about sensible qualities, that are apparently justified on purely visual grounds, are made in cases where the stable intuitive view is that there is no temptation to think of them as supporting dispositionalism. Thus the argument from similarity cannot by itself support the thesis that color properties are dispositional.

This points to a unified explanation of similarity and dissimilarity claims as being in some non-literal sense about appearances. As we saw, Kripke pointed out that it is common to find examples of claims that are not literally about appearances but are in some sense meant as claims about appearances—and that, we might add, are epistemically grounded only insofar as they are about appearances. As shown by the analogy with shape, it is very reasonable to take intuitive similarity and dissimilarity claims about the sensible properties quite generally as being in some sense about appearances. This explains the intuition that they are true: a sensation of a highly compressed ellipsoidal shape is not as similar to the sensations of sphericity or of the shapes of oranges as these latter sensations are among themselves (a highly compressed ellipsoidal shape does not look as similar to the orange shapes and spherical shapes as these look among themselves); a sensation of canary yellow is not as similar to the sensations of the shades of blue as these latter sensations are among themselves (canary yellow does not look as similar to the blues as these look among themselves). And it explains the impression that the literal claims are justified on purely visual grounds, for the corresponding judgments about appearances are justified on purely visual grounds, and could not be scientifically refuted. That the claims are typically meant as claims about appearances is also independently plausible, since the aspects of similarity and dissimilarity between sensible properties that we presumably care about in everyday contexts have to do with appearances.

<sup>42</sup> The analytical equation of the sphere bears an evident similarity to those of ellipsoids in general (the sphere is just a particular case of an ellipsoid). Any orange has a vastly more complicated shape.

Johnston ((1992), 253) contemplates the reply that similarity claims are in some sense really about appearances. He objects that it implies that “vision tells us almost nothing about what canary yellow, teal, turquoise, sky blue are like. (...) On the other hand, vision can acquaint us with the natures of the color properties if these properties are dispositions to produce visual responses” (*ibid.*, 253). This is supposed to be an advantage because, according to Johnston, “our implicit cognitive values favor acquaintance with objects, people, places, and hence with their properties. If that is so then we have reason to want vision to be a mode of access to the natures of visible properties [such as the colors]” (*ibid.*, 255). Ultimately, thus, Johnston’s similarity argument for dispositionalism relies on the additional premise that we have some intuition that vision acquaints us with the natures of the color properties. I have no such intuition, and I think it’s clear that several much more clearly intuitive ideas about color go against it.<sup>43</sup> It is surely part of the common view that there are all kinds of scientific truths about color shades that are not available just on the basis of visual perception.<sup>44</sup> (And it is part of the common view that science might discover tomorrow that Kripke’s killer blue exists, although its existence and properties could not be known on the basis of pure visual experience.) Just as in the case of shape, once we note this momentarily forgotten intuition we reach the stable view that if an intuitive dissimilarity claim is meant as a claim about color properties, then it may be upset by science and does not receive an adequate ground from pure visual experience. The natural view is then that the claim is not typically meant as about color properties, as we just argued.

#### *Unrecognizable conceptually necessary truths*

Motivated especially by altered dispositions (see above), Wright ((1988), 14, n. 26, (1989), 193ff., (1992), 117ff.) has proposed to withdraw biconditional analyses in favor of dispositionalist “provisoed biconditionals”. An example is “For any perceiver S: if S were perceptually normal and x were presented to S under perceptually normal conditions, then

<sup>43</sup> So we should doubt that it is part of our common view of colors unless we want to follow Johnston in convicting this view of blatant inconsistency.

<sup>44</sup> See related remarks in Jackson (1996), 210f.

(S would judge x to be green if and only if x was green)”. Note that this kind of principle fails to assign the color green to Johnston’s chameleon’s skin in the dark, and in general fails to assign a color to an object while it’s not being observed under normal conditions. Wright proposes that our concepts of the colors are only partially dispositional and that the color of objects not observed under normal conditions is determined by non-dispositional characteristics (cf. (1992), 126f.). This is a weak form of dispositionalism. Still, it falls prey to Kripke’s killer blue, faint colors, color mixture, and color illusion counterexamples, provided simply that we take the conditions of observation in them as normal.

Wright ((2002), 426) has nevertheless suggested the possibility of including the requisite that “the surface be presented against a matt black background” in the list of conditions under which an object is green iff it produces an immediate perceptual judgment that it is green; in fact, among these conditions he includes also requirements such as that the object be “relatively stationary (i.e., stationary or slow-moving relative to you the observer)”, and that the observer be “free of spots before the eyes, after-images, and so on” (*ibid.*). Perhaps Wright would be ready to include also the conditions of observation that obtain in all known counterexamples to biconditional analyses. One among several objections to this move would be that there is a strong intuition that the resulting “provised biconditional” cannot possibly be *a priori* or conceptually necessary—as needed by Wright, who intends to sustain the primary/secondary quality distinction claiming that corresponding “provised biconditionals” about Locke’s primary qualities are, if true, *a posteriori* so. But Wright has argued that no enrichment of the antecedent would inevitably take away the conceptual necessity of the “provised biconditional”.

Wright’s reason for this claim is an alleged parallel with Church’s thesis, the hypothesis that the effectively calculable functions are the recursive ones:

Effective calculability is an intuitive notion; general recursiveness is a mathematically precise one. The thesis is precisely an attempt to give a mathematically exact characterization of something pre-formal. In the nature of the case, it therefore admits of no conclusive formal proof. Yet, if it is true, it is true purely as a reflection of the character of the concepts involved (...). Our concept of the variety of ways in which the redness of an object might in principle be masked by how it seems, or in which how it seems might be deceptive, ought to allow of correct circumscription, just as the concept of effective calculability ought. If we alight upon such a circumscription, it will certainly be too complicated to enable its truth to be recognizable immediately, just by the light cast by the analytic understanding, as it were; and there is no basis on which its truth might be recognized inferentially. As with Church’s thesis, its *a priori* correctness, if it is correct, will ultimately be supportable only defeasibly, by the failure of hard reflection to find it wanting (Wright (2002), 427).



Of course Wright could not claim that the mere “failure of hard reflection to find it wanting” is sufficient to effect a distinction between a true dispositionalist “provisoed biconditional” for color and a true dispositionalist “provisoed biconditional” for shape, say. Suppose we have managed to formulate a “provisoed biconditional” for yellowness that after many years both hard reflection and experience have been unable to find wanting. Would this show that yellowness is a dispositional property, or that dispositionalism is *a priori*? Not at all. It is equally imaginable that we could manage to formulate a “provisoed biconditional” for sphericity that after many years both hard reflection and experience would be unable to find wanting. Wright’s suggestion seems to be, rather, that the case of Church’s thesis gives us grounds for thinking that some propositions that should be considered as conceptually necessary (if true) are unrecognizable as true, whether immediately or inferentially.<sup>45</sup> A suitable dispositionalist thesis, for all we know, might be one of these. This would provide a partial defense of dispositionalism.

A decisive problem here, however, is that, although it is in fact a popular view, or has been so until recently, there is actually nothing in the nature of the case that precludes a recognizably conclusive proof of Church’s thesis. Surely no proof within standard mathematics can be given, because the concept of effective calculability is not a concept of standard mathematics. But if by a conclusive proof we just mean, as we certainly must in a philosophical context, a proof that uses only conclusive truths and rules (regardless of their subject), then there is no obstacle in principle to a conclusive proof of Church’s thesis, just as there is no obstacle in principle to a conclusive proof of any *a priori* truth containing concepts from outside standard mathematics (such as ‘1 melon plus 1 melon equals 2 melons’).<sup>46</sup> This spoils Wright’s partial defense of dispositionalism. For Wright’s basic idea is that we know that some propositions that should be considered as conceptually

<sup>45</sup> Thus, if Wright assumes that conceptually necessary truths are *a priori*, he must be using ‘*a priori*’ in some unusual sense on which conclusive knowability (by humans), or knowability *tout court*, is not a necessary condition of apriority. This by itself is no objection to Wright as long as he holds that “provisoed biconditionals” for the traditionally primary qualities are not *a priori* in his sense.

<sup>46</sup> Incidentally, Kripke has long noted in his classes on recursion theory that there is no obstacle in principle to a proof of Church’s thesis.

necessary cannot be conclusively recognized as true. But Church's thesis is certainly not an example, and it is unclear that one can be produced. Without an example (or a proof that it exists), we cannot say that there is no basis to think that the truth of a conceptually necessary "provisored biconditional" might be conclusively recognized inferentially, as needed for Wright's defense to work. The default presumption is that there is no obstacle in principle to conclusive proofs of conceptually necessary truths.

In any case, nothing but a proof that the true dispositionalist "provisored biconditional" would not be conclusively recognizable as true could give some comfort to the dispositionalist. Suppose we managed to prove that some other proposition is conceptually necessary but not conclusively recognizable as true. Then an appeal to this fact could be used also by a proponent of the thesis that shape properties are dispositional as a matter of conceptual necessity. He might claim that our impression that we cannot convince ourselves conclusively that they are true is explained by the possibility that the true dispositionalist "provisored biconditional" about sphericity is one of the conceptually necessary truths that are not conclusively recognizable as true. This leaves us where we stood. Unless we are antecedently convinced that some dispositionalist "provisored biconditional" about color is a conceptual truth, the most reasonable explanation of our impression that we could not conclusively convince ourselves that it is true is not that it might be unrecognizably true, but that it is not conceptually necessary.

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