

IT'S A COLORFUL WORLD

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I. WHY WE ARE NOT IN EDEN

Is Adam the only one who enjoyed a 'world of perfect living colors'? Was it only in the Garden of Eden that when an apple looked red, 'the apple was gloriously, perfectly, and primitively red'? Has Adam's Fall from Eden condemned us all to imperfectly veridical visual experiences, with objects instantiating only imperfect color properties? Such is our predicament, claims David Chalmers.¹

In his paper *Perception and the Fall from Eden*, Chalmers argues that perfect color properties are not to be found instantiated in our world in the way they are presented in the phenomenology of our experience—namely, as simple primitive intrinsic properties belonging to physical objects; they are to be found instantiated only in a possible world different from our own, which he refers to metaphorically as Paradise lost.

Chalmers's arguments are directed against the contemporary view in the debate on the nature of color held in a variety of versions by Campbell 1993, McGinn 1996, and others, which he calls *Primitivism*, and describes thus:

Primitivism . . . holds that colors are certain *primitive intrinsic properties* that are not phenomenal properties or properties of our visual field, but are nevertheless *constitutively con-*

nected to such properties. On this view colors have an intrinsic 'qualitative nature' that is *revealed* in some fashion by color experiences. . . . There is a certain phenomenological plausibility [in Primitivism] . . . but [it] seem[s] to have the counterintuitive consequence that color experience is massively illusory. When we have an experience as of a red apple, it seems unlikely that the apple itself . . . instantiates a simple intrinsic property with a qualitative nature that is constitutively connected to the quality of my visual experience. (Chalmers 2004b, p. 169, my emphasis)

The strength of Primitivism lies in providing an account of color that respects our intuition about objects being truly colored as they appear to us—what Chalmers calls its 'phenomenological plausibility.' Its weakness however is its inability to supply a metaphysics which can accommodate skeptical worries such as the ones Chalmers lines up against it.

The present account proposes to remedy that weakness. For the intuition motivating Primitivism is irresistible. But one also cannot dismiss Chalmers's worries about Primitivism. The position to be set out here therefore endeavors to hold on to the phenomenological plausibility of colors being in the world, while providing a metaphysical account for the claim of a 'constitutive connection' between colors in the world and our experi-

ences of them, an account that can withstand Chalmers's criticism of Primitivism.

Here is how Chalmers chronicles our Fall from Eden. He argues that by eating from the Tree of Illusion Adam learned that 'objects sometimes seemed to have different colors . . . at different times, even though there was reason to believe the object itself had not changed.' From Eve's being, by hypothesis, spectrum-inverted relative to him, Adam learned that 'a red apple . . . can cause phenomenally red experiences [for him] . . . and (in some circumstances) can cause phenomenally green experiences [for Eve], without any change in its intrinsic properties.' This taught him perceptual egalitarianism, since he had no reason to favor as more veridical his perceptual experiences over Eve's. From the experience of hallucination, Adam learned that 'one sometimes has phenomenally red experiences in the absence of perfect redness.' Finally, eating from the Tree of Science he learned that his visual experiences are the result of 'a long causal chain from the microphysics of the [object's] surface through air and brain to a contingently connected visual experience.'

From Chalmers's arguments we are well advised to give up the notion that we are *immediately* acquainted with colors as we were in Eden,² in favor of a perceptual causal interaction between the object and the perceiver. There is also reason to question whether colors are *intrinsic* properties of a surface, in view of the possibility of inverted spectrum vision together with perceptual egalitarianism. At the same time, we reckon that colors are *non-relational* properties. Shoemaker put forward a position that makes the qualitative nature of color properties in objects relational (Shoemaker 1996, pp. 252–254). This is unsatisfactory because explaining the qualitative nature of the color red in the apple as a relation is sacrificing the phenomenological given. As others have pointed out as well, when we look at colored objects, we simply

do not see relations (for example, McGinn 1996, pp. 541–542).

Having set these initial constraints, let us now turn to the 'constitutional connection' of the qualitative nature of colored surfaces to our color experiences. The position to be put forward here could be called *Constitutionalism*, as it offers a metaphysics for this connection. The aim is an account of objects that allows them to *possess* the colors we see them as having, as their properties, while making these colors as *dependent* on their environment as our everyday experience shows them to be. It is not naïve realism about colors that we are after, since this has proven to be too inflexible to accommodate all the color variations and dependencies of which everyday color phenomena make us aware. Nor is it dispositionalism about colors, which abandons the central message that color perception delivers about the world. It is a position that retains the colorfulness of objects, while making the colors of these objects sensitive to various factors in the object's environment.

II. CONSTITUTIONALISM

Sharing some of the Primitivist's phenomenological intuitions, and *contra* Chalmers, the Constitutionalist holds that objects do have surface qualitative natures. Let us call a *sensuous property*³ of a surface the qualitative character of the surface that according to Primitivism is revealed in a color experience. On Chalmers's description of Primitivism, "colors have an intrinsic 'qualitative nature' that is revealed in some fashion by color experiences." Also, Maund says that it is "a 'prime intuition' that colors are represented as qualitative, sensuous features" (Maund 2002). But on account of Chalmers's arguments from perceptual egalitarianism and inverted spectrum vision, and *contra* Primitivism, Constitutionalism does not hold that an object's surface has a single intrinsic qualitative character. Rather,

according to Constitutionalism, objects possess surface microphysical properties; these properties interact with perceivers in various circumstances; under such conditions they are disposed to ground different qualitative features of surfaces, varying according to the circumstances.

From science we have come to recognize that perception occurs in virtue of a causal interaction between a colored object and a perceiver. This interaction takes place at the physical level between, e.g., a red object and the perceptual system of the perceiver. This *causal interaction* is the ground for the occurrence of the perceptual experience of the perceiver; she sees the red apple. But further, it is a distinctive feature of Constitutionalism that the same causal interaction is also the ground for the realization of a sensuous property of the red surface. Thus the experience of the perceiver and the sensuous property of the object are *co-realized*.

The apple's surface 'sensuously-reddens' in the world only while interacting with a perceiver. This is the core on which the Constitutionalist builds her account of sensuous properties, responding to Chalmers's criticisms of Primitivism. On Constitutionalism, objects have microphysical surface properties independently of perceivers. Colors are realized only for the duration of the interaction between the microphysical properties and the perceiver. Under normal perceptual conditions, the interaction of a red apple with a perceiver grounds the sensuous property red of the apple's surface. The perceiver's color experience and the object's sensuous property are distinct from one another, but have co-extensive life spans, sustained by the physical causal interaction between object and perceiver.⁴ Thus the apple possesses the color red when and only when the perceiver has the experience of the red apple in normal perceptual conditions. (Discussion of hallucinations follows.) When the apple is not perceived, in virtue of its surface microphysical properties

it has the disposition to possess the color red in normal perceptual circumstances.

It follows that a sensuous property is not an experience in the perceiver. If it were, then the object's disposition to cause color experiences in a perceiver would explain all there is to color. But there is more to explain about color than surface microphysics and the object's disposition to cause color perceptions, as McGinn (1993, pp. 261–262) and Campbell (1996, p. 540), among others, have argued. The phenomenology of color requires an ontology of color to back it up. This motivated the Primitivists, and it also motivates the present account.

So according to Constitutionalism, colored objects do not appear in full sensuous-appearance all the time. They need specific external conditions to obtain in order to realize their sensuous properties. It is only in the context of the causal interaction with a perceptual system that an object's surface can realize its sensuous properties. The perceiver's perceptual system, though external to the object, is a necessary realization-ground for the sensuous properties of the object. To understand this dependence on external conditions, consider a car. It can reach its maximum speed on a flat road surface. The causal interaction between the car and the road is the realization ground of the speed of the car. The flatness of the road is (in this case) a necessary external condition for the car to realize its speed potential in the course of the causal interaction between car and road. In the case of sensuous properties, a vision system is a necessary external condition for a sensuous property of a surface to be realized in the course of the causal interaction between object and perceiver.

A sensuous property is a property of the colored object's constitution, despite its dependence on external conditions for its realization. Let us consider an example of another constitutive property which is grounded on a causal interaction with the environment. When some gas is released into a cubic con-

tainer, the cubic shape of the volume of gas supervenes on the location of the individual gas molecules which are in causal interaction with the container. This shape of the volume of gas lasts while the gas's causal interaction with the external conditions persists. Yet, the cubic shape is a constitutive property for the volume of gas. In our case, the sensuous property is a *constitutive property* of the object's surface, although it is realized on the ground of, and for the duration of, the causal interaction of the microphysical properties of the object's surface with the vision system of the perceiver.

The dependence of, e.g., sensuous red for its realization on the vision system of a perceiver does *not* make the sensuous property *mental*. For, as Peter Simons writes, "the concept [of dependence] is modal . . . the intended meaning of dependence/independence marks *not a qualitative but a modal-existential difference*: dependent and independent objects exist in different ways" (Simons 1987, p. 316, my emphasis). Therefore the dependence on the vision system does not require sensuous properties to be mental. The present account leaves open for the time being the question whether sensuous properties are physical, mental, or otherwise. An answer to that question must be deferred to another occasion. Primitivists take colors to be categorially primitive properties of objects—not physical, mental or dispositional.⁵

Nor does the dependence of sensuous properties on the causal interaction between object and perceiver make those properties relational. Reasons were given above for the phenomenological implausibility of a position such as Shoemaker's relational sensuous nature of, e.g., red; such a conception of sensuous nature does not bear any similarity to the way we perceive red—i.e., as a monadic property. Sensuous properties are *non-relational*. On the Constitutionalist's account, the sensuous-red of an apple supervenes on the physical causal interaction between the

surface of the apple and the perceiver; more accurately, between the microstructure of the surface on the one hand and the perceptual environment on the other, which includes the conditions of the physical environment and the vision system of the perceiver. The causal interaction is of course relational, but its relationality does not transfer to the property at the supervening level. Sensuous red is a monadic property of the surface of the apple grounded on the apple's relation to the perceiver. It is *not* an *intrinsic* property of the surface of the apple, since it rests on the relation between the surface and the (external) perceiver and environment.

Both the experience of the perceiver and the sensuous red of the apple *supervene* on the physical interaction between the apple and the perceiver which grounds them. The two supervening properties/activities (hereafter 'properties' for short) are dependent on the subvening physical interaction for their realization. But the relations between them (more precisely, among the three of them) are more complex than supervenience can capture. Supervenience itself involves the *dependence* of the supervenient on the subvenient properties which determine them; and the *covariation* of the supervenient properties with their subvenient ones. But this describes only the vertical relations between, on the one hand the experience and the sensuous property, and on the other hand the subvening physical causal interaction. In addition to the vertical relations there are horizontal relations between the two supervening properties (i.e., color experience and sensuous property); these relations are, of course, grounded on the vertical ones. The sensuous property and the experience are horizontally related by co-dependence, co-determination, and covariation relations between them.

The color experience and the sensuous property are *co-dependent*, being co-realized in the perceptual process. Their co-dependence is why the experience and the sensuous

property have coextensive life spans. In cases of hallucination, no sensuous property is realized since there is no colored object. In such cases, the perceiver's experience is realized without a sensuous property being realized. Clearly the mechanism and the metaphysics of hallucinations are different from those of perception. The present account follows the disjunctivist position in allowing for indiscernible hallucinations and perceptions which have nothing in common in their constitution.⁶ On the perceptual mechanism, the experience is bound up with the sensuous property in the ways to be described in what follows. On the hallucination mechanism, the experience is independent of any sensuous property.

The color experience and the sensuous property are mutually qualitatively *co-determined*. The qualitative nature of the content of the experience is co-determined with the qualitative nature of the sensuous red. This relation between the two must be the basis for the Primitivists' claim that the color experience reveals the qualitative nature of the color. The physical interaction which grounds both the experience of red and the sensuous red supplies the common foundation for their qualitative co-determination.

Finally there is *covariation* of the experience with the sensuous-property. Their covariation relation is different from their co-determination and co-dependence relations. Neither of these relations entails covariation. Consider the existential dependence of a daughter on her mother, and further, the qualitative determination of the daughter by the mother. No covariation between mother and daughter, in either direction, follows from these relations.⁷ The covariation between the qualitative nature of the content of the perceiver's experience and the qualitative nature of the sensuous property is horizontal. Previously we encountered vertical covariation—of the supervening (experience and sensuous property) and subvening (causal interaction) levels.

The Constitutionalist must now address the following two questions: since perceptual experiences can continue (or even start) after the seen object has ceased to exist, can sensuous qualities exist without qualifying any object? Or is the object they qualify not the one we ordinarily take ourselves to be seeing? The Constitutionalist offers the following extended answers.

The horizontal relations presuppose the co-realization of the sensuous property and the perceiver's experience. Consider now the case where a perceived colored object has ceased to exist when the perceptual experience occurs. Constitutionalism needs to say which object possesses the sensuous property that is co-realized with the perceptual experience. Answer: the sensuous property still belongs to the colored object that has ceased to exist.

The Constitutionalist here follows Timothy Williamson in distinguishing between the logical and the concrete sense of 'exist,' and in associating property possession with the logical sense of 'exist.' Williamson writes:

Whatever can be counted exists at least in the logical sense: there is such an item. Past objects are no counterexamples to the principle that having properties or relations entails existing in at least the minimal sense. "Trajan does not exist" is true when "exist" is used in the nonlogical sense of concreteness, not when it is used in the logical sense. . . . Trajan now stands in causal and semantic relations to various objects. He still has relations, but does not still exist. (2002, p. 245)

The ('posthumously' realized) sensuous property belongs to the object that ceased to exist, since the object still exists in the logical sense. The object can posthumously causally impact on the perceiver because it still exists in the logical sense. This situation arises only because of the time gap in the transmission of the causal efficacy of the colored object to the perceiver.

It might be objected that there is no horizontal covariation of the experience with the

sensuous property, in view of the possibility of illusion. That is, if one can misperceive a color, the qualitative character of the content of one's experience must be independent of the qualitative nature of the sensuous property realized. But according to Constitutionalism, there is no illusion; there are no deviant causal chains in nature. The sensuous properties realized are different in varying perceptual environments even if the microphysical properties of a surface do not change. (The perceptual environment required for a sensuous property's realization is a combination of the physical environment within which the perception takes place, and the perceiver's vision system itself.) It follows that we should introduce the notion of the sensuous *nature* of the surface of an object, which consists of the set of sensuous properties of that surface, each of which is realizable in different types of perceptual environment.

We do of course distinguish, for pragmatic reasons, between normal and abnormal perceptual conditions. On the basis of this we deem some experiences illusory in so far as the perceptual causal chains are deviant in relation to the normal perceptual circumstances. But it is important to recognize that the everyday sensuous red we see in red apples and roses is *no more* 'the sensuous nature' of the surface than the sensuous orange⁸ we might see looking at the same red apple when perceiving it under the influence of a drug. Sensuous orange is just the sensuous property that is realized when the apple is perceived under such conditions. And sensuous red is just the sensuous property that is realized when the apple is perceived under normal conditions. But there is nothing that privileges normal conditions of our environment and our vision system over other environments or vision systems that might have evolved or might be artificially created. Once we realize that our perceptual system and environment play a role in the realization of the sensuous property of a colored object even under

normal conditions, then it follows that the only privileges normal conditions may enjoy over abnormal conditions are pragmatic, not related to how things are or are not. So any sensuous property that is realized in a perceptual setup, no matter how atypical, deviant, or abnormal the setup is, is the surface's sensuous property on a par with the property realized under normal conditions. We may suppose that you have inverted spectrum vision; or that you perceive the apple through a deviant causal chain; or that you are a mutation with respect to sensory apparatus in a post-nuclear-war era. (One can readily think of scenarios where you are in the majority, for the sake of vote counting.) All such circumstances realize different properties of the surface's sensuous nature. As far as the surface's sensuous nature is concerned, there is egalitarianism regarding the veracity of the various perceptions resulting from these alternative setups.⁹ But as far as our pragmatic considerations go, there is the monarchy of the normal perceptual conditions, relegating other perceptions to illusion and the like. The convention of 'a pragmatic' point of reference is not at odds with Constitutionalism.

Finally, it follows from this account that there is no direct causal relation between the sensuous property of a surface and the experience of the perceiver. Yet we do believe that we see the color of a surface. According to Constitutionalism, both the color and the experience supervene on the subvening physical causal interaction between the surface and the perceiver. How then do we perceive the color, if it is not the cause of the experience? The answer is that supervenient phenomena have causal potency even if they are not direct causes of other phenomena. Here the Constitutionalist follows Jaegwon Kim in explaining the causal efficacy of supervening phenomena in terms of the 'causal processes taking place at a more basic physical level' (Kim 2003, p. 252). On Kim's line of reasoning, when a supervening property/activity S

causes another supervening property/activity S^* , this is so because S supervenes on a physical property/activity P , and similarly S^* on P^* , and P causes P^* . For Kim, S has in this case a causal role to play with respect to S^* , and it is not to be treated as a causally inert epiphenomenon.

The relations in the perceptual case are more complex than this outline suggests. Following Kim, although the supervening sensuous property is not a full-blooded direct cause of the perceptual experience, it is causally relevant for the generation of the experience in that it supervenes on the cause-effect relation between the object's microphysical properties and the perceiver's vision system. In the foregoing discussion we saw that the co-dependent, co-determined, and co-varying sensuous property and experience were grounded on the same underlying conditions of the causal interaction. But this does not clash with the asymmetry of the cause-effect relation of the object's microphysical properties on the vision system of the perceiver. Nor does it clash with the sensuous property qualifying the colored object and the experience belonging to the perceiver.

To see this, consider the following case. Your desktop is not exerting any force on anything when not pressured. This seems similar to an object which does not have any sensuous properties when unobserved. But when a vase drops on the desktop, two forces are generated from the causal interaction between the vase and the desktop—two forces that counterbalance each other: pressure, and counter-force. What is generated in the course of the causal interaction depends on the make up of the vase and of the desktop (internal conditions), but also on the particular energy distribution in their movements, their orientation relative to each other, etc. (external conditions). Yet the two forces do not supervene neutrally on the physical causal interaction of the vase and the desktop. Rather, they belong to the two objects respectively: the pressure is exerted

by the vase and the counter-force by the desktop. Since each object's internal conditions, as well as its respective external conditions (which include the environment, but also the internal conditions of the other) determine how it becomes involved in the causal interaction, why is either of the two forces more the one object's rather than the other's? There seems to be parity of involvement, and so we would expect parity of belonging to the mutual interaction. The reason why the one generated force belongs to the vase and the other to the desktop is the contribution that each object makes to the nature of the generated item. For example, if the desktop had a different make up, given the same external conditions it might have become involved in the causal interaction with deformation or displacement. The counterforce results from the desktop's hardness—external conditions being equal. Had it been made of canvas, deformation would have also resulted. The role of the desktop's make up in determining the nature of the generated item in the causal interaction—the counterforce—anchors the counterforce on the desktop. The counterforce is grounded on the causal interaction, since it depends also on conditions external to the desktop; but it is anchored in the microphysical constitution of the desktop to which it owes its nature—external conditions being equal.

Similarly in the case of color. It is the make up of the object that determines that, given the external circumstances, it becomes involved with the generation of a sensuous property; while it is the make up of the perceiver that determines that, given the external circumstances, it becomes involved with the generation of an experience. The role of the object's make up in determining the nature of the generated item in the causal interaction—the color rather than the experience—anchors color on the object, despite its dependence on the external circumstances (which include the environment, but also the

perceiver's internal conditions). The color is grounded on the causal interaction as a whole, but it is anchored on the microphysical constitution of the object to which it owes its nature as color.

The asymmetry of the subvening cause-effect relation enables one to distinguish between Constitutionalism and an epiphenomenal account of colors. The supervening sensuous property acquires its causal relevance in relation to the perceiver's experience from the cause-effect relation at the grounding physical level. Colors are not inert terminal effects of causal routes; rather, their causal relevance derives from the grounding physical causes in the surface microstructure of the object to which they belong.

III. CONCLUSION

How Edenic is our world? In Eden there is only one sensuous property associated with a red surface. This is the 'perfect redness' that is instantiated in all red objects whether they are perceived or not. In Eden sensuous red saturates the surface of an apple (behaving like a coat of paint on a surface which excludes at a given time other coats of paint). Sensuous orange cannot find a way onto that surface (without physical change of the surface), let alone all the other sensuous properties of a red surface that may be activated under various perceptual conditions.

But what about our world? According to Constitutionalism, the surface of the apple *is* indeed red, because sensuous red is realized under normal perceptual conditions. Sensuous red and all the other sensuous properties of a surface are not figments of our imagination in a colorless world of science. Which sensuous property is realized on any given perceptual occasion cannot be determined by the microphysical properties of the surface alone, independently of the perceptual environment. And no one of them is genuine to the exclusion of the others, to

be revealed to us by our preferred perceptual environment. Different perceptual conditions may obtain, simultaneously or diachronically, thereby enabling the surface of the apple to flash-out its various sensuous properties in different directions to different perceivers at the same or different times. No single sensuous property of a surface saturates the surface of an object.

Here is our world: it has colored objects, like the red apple. Colors are grounded on the causal activity of the physical microstructural properties of colored objects' surfaces. When we see colors, we do not see micro-structural properties; nor do we see dispositions or relations. We see a red or yellow, etc., surface. The qualitative feature of the perceived surface, its redness, yellowness, etc., is one of a set of sensuous properties of the surface which comprise the surface's sensuous nature. Which sensuous properties of the surface we see depends on the perceptual environment. There are multiple dependence, determination, and variation relations among our perceptual experience, the sensuous properties of a surface, and the underlying physical causal interaction between the surface's microstructure and the perceiver's vision system, through the physical environment. None of these relations requires sensuous properties to be mental or relational. When unperceived, our world is like the 'colorless' world of science, because perceptual environments are needed for the instantiation of sensuous properties. But no perceptual environment 'reveals more truly' a surface's sensuous nature than any other. So most of the time, a surface's sensuous nature remains dormant; but when observed, it rises to its full splendor as its multifarious sensuous properties are realized in varying perceptual circumstances. It is a very colorful world!

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NOTES

Thanks are owed to David Chalmers, David Charles, Richard Holton, Mohan Matthen, Matthew Nudds, Mike Ridge, Dory Scaltsas, Tim Williamson, the editor, and the anonymous referees for their fruitful criticisms of various ancestral versions of this paper.

1. All the quotes, unless otherwise specified, are from Chalmers 2004a.
2. Chalmers (2004a): "In the Garden of Eden, we had unmediated contact with the world. We were directly acquainted with objects in the world and with their properties. Objects were simply presented to us without causal mediation, and properties were revealed to us in their true intrinsic glory."
3. The term 'sensuous' is used without any commitment to the mental. For the legitimacy of this use of the term, see Maund (2002).
4. The Constitutionalist is guided here by philosophical intuitions that can be found in Aristotle's treatise *De Anima* (in particular 425b26–426a1).
5. For example, McGinn 1996, p. 548: "Now we have, in addition to mental or physical properties (and combination thereof), a further set of basic properties that objects may instantiate—the colors." "To the old question, 'Are colors mental or physical, subjective or objective?' we must answer, 'Neither: they constitute a third category, just as real as, but distinct from, mental and physical properties.'" "Colors are primitive properties, not analyzable in any other terms: 'red' simply denotes the property of being red, not the property of being disposed to look red" (McGinn 1996, p. 550).
6. E.g., Martin 2004, p. 37: "The disjunctivist theory of perception claims that we should understand statements about how things appear to a perceiver to be equivalent to the disjunction that either one is perceiving such and such or one is suffering an illusion (or hallucination); and that such statements are not to be viewed as introducing a report of a distinctive mental event or state in common to these various disjoint situations."
7. On the difference in the formal properties of dependence and covariation, see Kim 1999, p. 546.
8. A terminological clarification: sensuous orange is the color of a surface realized when a normal perceiver sees, e.g., carrot soup under normal perceptual conditions.
9. Chalmers uses an argument from perceptual egalitarianism, but only for normal and inverted-spectrum vision, as opposed to our present extension of the argument to cover illusion as well. Chalmers says that privileging normal versus inverted spectrum vision "imposes an asymmetry on what otherwise seems to be a quite symmetrical situation. . . . The perceptual mechanisms themselves, involving light and brain, seem to be symmetrically well-functioning in both communities. . . . This view yields a serious skeptical worry: it seems that we have little reason to believe that we are in a community that normally perceives veridically as opposed to non veridically."

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