

The Ontology of Some Afterimages

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Abstract:

A good portion of the work in the ontology of color focuses on color *properties*, trying to figure out how they are related to more straightforwardly physical properties. Another focus is realism: are ordinary material objects such as pumpkins really colored? A third emphasis is the nature of what is referred to by the terms ‘what it’s like’ or ‘phenomenal character’, as applied to color. In contrast, this essay is exclusively about select color tokens. I will be arguing that whether or not ordinary objects such as pumpkins are colored, regardless of what the true theory of color properties is, and independently of any talk of phenomenal character or what-it’s-likeness, some afterimage experiences are very hard to fit into any plausible ontology, physicalist or not.

The Four Options for Afterimages

Suppose you have a very bright light bulb in the shape of a cow. The light is on and you stare at it from two feet away for about 30 seconds straight. Then you close your eyes tightly and put your hands over your eyes. What happens next is that you experience an afterimage, a cow-shaped blob of color that changes color over time. For me, it starts out orange, then it’s red, then it’s pink, then it’s violet, and then it fades away. And it is roughly cow-shaped the whole time. Let’s introduce some times into the scenario:

4:00:00pm: You close your eyes after staring at the brightly-lit cow-shaped light bulb.

4:00:01pm: You start experiencing a cow-shaped-and-orange-but-not-red patch.

4:00:01pm: Someone breaks the light bulb; your eyes are still closed and you're still experiencing the cow-shaped-and-orange-but-not-red patch.

4:00:10pm: With your eyes still closed you gradually stop experiencing a cow-shaped-and-orange-but-not-red patch and start experiencing a cow-shaped-and-red-but-not-orange patch.

One truly has to go through something akin to this process in order to philosophize at all fruitfully about afterimages. At the very least, one should do it with an ordinary light bulb before reading much further.

When one has done so with the cow-shaped bulb, it will certainly *seem* as though there was this thing, *a cow-shaped-and-orange patch*, in your visual field from 4:00:01 to 4:00:10. Thus, it seems as though this is a correct description of how you started out:

There was a spread (expanse, blob, patch¹) of color, call it X, that

- (a) you were visually experiencing from 4:00:01 to at least 4:00:10 even though your eyes were closed,
- (b) was cow-shaped (at least approximately, like a drawing of a cow) during that whole time, and
- (c) was orange during that whole time.

I will use 'afterimage' as a term for X. I will use 'afterimage experience' for the visual experience, whatever it really is, that happens when one does the light bulb experiment. Our question in this essay is this: *what is X?* In other words, what is the thing that satisfies all three of (a)-(c)? I'll go over each of the only possible candidate answers:

1. X doesn't exist.
2. X exists and is an external physical thing (the surface of the light bulb perhaps).

¹ I use 'patch' in a neutral way so that the "patch" might be an ordinary external physical object (e.g., a light bulb), some part of the eye or rest of the human body, a part of one's non-physical soul, etc.

3. X exists and is a non-physical thing.
4. X exists and is an internal physical thing (some part of the eye or brain perhaps).

In the pages that follow there are mistakes in my arguments. There *have* to be: I am going to be arguing against all the possible options for afterimages. My goal is to merely present the views and their main serious problems. My thesis regarding X is not that such-and-such an option is false but that each option faces difficult objections. My own view is that (4) is our best bet, but my arguments will not show even that relatively modest thesis.

Option 1: The Afterimage Does Not Exist

Until recently no philosopher who worked extensively on perception and sensory experience—H. H. Price, Husserl, C. D. Broad, Ayer, Russell, Moore, and others—would even seriously consider denying that X exists. Nonetheless, many contemporary philosophers of perception hold that there is nothing that satisfies all of (a)-(c).

At first, this may seem crazy: when one is having the afterimage experience it sure seems as certain as anything ever gets that there is a colored thing there!

1. If the afterimage X didn't exist, then when you closed your eyes you would experience just *darkness*, uninterrupted by any colored expanse. That's precisely what it would be like if there were no afterimages at all.
2. But of course that's not what happened when you closed your eyes. On the contrary, when you closed your eyes it wasn't just darkness! All one has to do is briefly look, and one will see that breaking the darkness was *color* and *shape* instantiated in something. The something in question may be subjective or ephemeral in various ways, but there was definitely *something there* that had color and shape.
3. Thus, X really does exist. So option (1) is false.

That is a reasonable argument, but the defenders of the 'X doesn't really exist' view have at least the beginning of an intelligent response: what exists is not an afterimage, which is a colored patch or spread

or whatever you would like to call it, but an *experience* of the old light bulb, which is a kind of mental process or event you're having and which is not colored or cow-shaped. For comparison, when you see a star at night, sometimes what you are seeing no longer exists: the star blew up millions of years ago but the light from it takes so long to get to earth that it's still arriving here. So even though you are, at midnight, visually experiencing star X, X doesn't exist at midnight while you are experiencing it.

More precisely, some advocates of the 'X doesn't really exist' option (1) offer the following analogy:

The Star Case	The Light Bulb Case
At time T1 the star existed and was giving off light	At time T1 the light bulb existed and was giving off light
At later time T2 it stopped existing (the star blew up)	At later time T2 it stopped existing (the light bulb was destroyed)
At even later time T3 we visually experienced the star	At even later time T3 we visually experienced the light bulb (via the afterimage experience)

Unfortunately, there are serious problems with *this* defense of option (1) (other defenses, below, are superior to this one). For one thing, it seems to most people that after you closed your eyes you were indirectly experiencing the light bulb *via the presence of the afterimage X*. That is, it's partly *in virtue of* the existence of the image that you are experiencing the light bulb: the presence of the image, at 4:00:02, was the primary (but not sole) *means* to experience the non-existent light bulb at 4:00:02. Here is the key point: the bulk of the reason you can, right now at 4:00:02 after the light bulb has been destroyed, experience the light bulb, is this: right now, at 4:00:02, there is an image that is in your visual field, and the image was generated in the appropriate way from looking at the light bulb. So, the image has to exist, otherwise you wouldn't be experiencing the light bulb after it was destroyed.

When it comes to the star case, the realist about afterimage X wants to know what it is *about* one's midnight visual experience that allows one to see the nonexistent star. It's all well and good to say that the current light coming into the eye somehow allows one to experience the nonexistent star, but what is it that the light is doing to make that happen? The realist has an answer: the light is helping to

produce an image, a white one, that exists at midnight. The eliminativist about the white spot that exists at midnight has to come up with a story that doesn't require any midnight image at all.

This suggests that the star case is just as puzzling as the afterimage case. In the afterimage case we struggle to find out what X is; in the star case we struggle to discover what the midnight white spot is. So even though the star-light bulb analogy is not bad, all this shows is that the star case is roughly as paradoxical as the afterimage one. So the analogy doesn't help option (1).

The option (1) advocates, who insist that X doesn't really exist, don't give up at this point. The most common reaction goes something like this:

When you have an afterimage there is some process going on in your visual system that is *importantly similar* to what goes on in your visual system when you see an external object with your eyes open in normal circumstances (for the afterimage experience in question, it's a bit as though one is in a dark room and there is a blurry object before one's eyes). For instance, suppose you take some LSD and hallucinate a pumpkin. So you are, in some sense of 'experience', experiencing an orange patch in your visual field. But strictly speaking, there is no orange patch there; it's just a hallucination after all. Your eyes and brain are functioning *as though* you are seeing a real pumpkin, at least approximately, but that doesn't mean there is any actually existing orange patch. In the case of some afterimage experiences, what is going on in your visual system is relevantly similar to what goes on when you see something like a rainbow, hologram, beam of colored light, or the sky; but there is no real thing in one's afterimage experience.

So their idea is this, temporarily focusing on hallucinatory images instead of afterimages:

- i. When you're hallucinating an orange pumpkin, you are having a certain visual hallucinatory experience E_{hall} .
- ii. When you see a real orange pumpkin, in perfectly ordinary circumstances, you are having a certain ordinary visual experience E_{ord} .

- iii. E_{hall} and E_{ord} are highly similar—similar enough that they seem pretty much the same visually from the inside, from the point of view of the one having the experiences. (This is consistent with them being dissimilar in philosophically interesting ways).
- iv. Even so, whereas in the case of E_{ord} there is an existent orange object (the pumpkin) *in the case of E_{hall} there isn't any orange object at all.*

Although (iii) can be intelligently rejected, the main questionable claim is the second part of (iv)—the claim that in the case of E_{hall} there is no orange object at all.

The problem with that part of (iv) is revealed when we try to figure out exactly *how* E_{hall} and E_{ord} are similar. On the face of it, the answer to what I will call *the challenge*,

Precisely *how* are visual experiences E_{hall} and E_{ord} so similar? In what *respects* are they so similar? What is it about them that *makes* them similar?

is this:

They are similar in the sense that for each one there is something that is orange, not red, and pumpkin-shaped: with one experience, E_{ord} , the thing in question is a pumpkin; with the other experience E_{hall} , the thing in question is an image that looks like a pumpkin. It's the *presence* of the two orange-but-not-red-pumpkin-shaped things that *makes* the two experiences E_{hall} and E_{ord} so similar. The similarity is obvious and open to introspection. It is the presence of the orange image in E_{hall} that *makes* that experience so similar to E_{ord} ; the experiences are alike *in virtue of* the fact that the image and the pumpkin are so similar. Thus, in the case of E_{hall} there is an orange-but-not-red-pumpkin-shaped thing, contrary to (iv).

The advocates of the 'X doesn't really exist' view have the burden of offering a detailed proposal on exactly what goes on—what has to exist—when one is experiencing the afterimage. Vague talk about how the hallucinating person is having a “visual experience” that's similar to the one a person has upon seeing a real pumpkin clearly won't do, as it fails to tell us *how precisely* the experiences are similar—and when we try to say what it is that makes the experiences similar, it is highly natural to end up admitting that X really exists.

The ‘X doesn’t really exist’ people could try to say that the two experiences E_{hall} and E_{ord} are similar in that they share some key *representational properties* (Block 1983, Dretske 1995, Harman 1990, Tye 1995, 1997, 2000 set the stage for recent discussion). More to the point, the reason the two experiences seem the same from the inside, especially when it comes to color and shape, is nothing over and above the fact that they share those representational properties. Both experiences represent orangeness and pumpkin-shape, and that’s the core of the reason they are similar. That’s how we answer the challenge posed above.

Surprisingly, the critic of (1) can accept all the claims of the previous paragraph. There’s nothing there that helps option (1)!

The problem is that even if this representationalist proposal is true, there’s nothing in it that avoids the image. The reason is this: it seems as though part of what *makes* the hallucinatory experience E_{hall} represent orangeness, for instance, what is doing most (but not all) of the representing work here, is the presence of the orange image that looks like a pumpkin. That is, it’s partly (not solely) *because* the hallucinatory experience involves an image that instantiates orangeness in a pumpkin-drawing fashion that it “represents the world” as containing an orange pumpkin. In addition, it seems clear that the whole reason the person having E_{hall} *consciously thinks* about the color orange at all (assuming this is a case in which she does so think) is that she is aware of an orange patch: it’s the presence of the patch (or blob, or spread, or whatever term you like to use) that got her thinking of orange in the first place. The approximate truth is the first claim, not the second:

Part of what makes it the case that she represents orangeness is the presence of an orange patch.

Part of what makes it the case that she experiences an orange patch is that she represents orangeness.

Hence, the critic of (1) can *accept* the thesis that what makes E_{hall} and E_{ord} so similar is completely exhausted by facts about representation or concepts or intentionality or the like. The thesis doesn’t address the ontological issue.

However, there is a way to use the representationalist idea to support (1). In order to pull it off, the advocate of option (1) needs two claims, one negative and one positive, and it's the negative one that is pivotal:

The *Positive Claim*: what makes E_{hall} and E_{ord} so similar from the inside when it comes to color and/or shape is completely exhausted by facts about representation.

The *Negative Claim*: what makes E_{hall} and E_{ord} so similar from the inside when it comes to color and/or shape does not involve E_{hall} having any existent orange, pumpkin-looking thing.

The conjunction of the two claims defines the *representation-with-no-X* view, which is what the supporter of (1) is looking for. As pointed out above, the critic of (1) need not object to the positive claim (she need not accept it either). All that really matters is the negative claim, and I know of no good reason to accept it. Indeed, the literature rarely distinguishes the claims, and it is even rarer to encounter anything more than the mere assertion of the negative claim.

I think it's safe to say that the *representation-with-no-X* view, applied to the afterimage experience we started out with (so we are setting aside hallucinations now), will strike a person as counterintuitive *provided* two conditions hold:

- a) It includes the negative claim that the afterimage experience involves nothing orange or cow-shaped (this is the analogue of the negative claim for hallucinations).
- b) The person in question actually tokens the afterimage experience type a few times and attends to it.

When you attend to the colorful afterimage experience are you looking at something that only suggests or calls up or is *about* orangeness? Or is the orangeness *spread out on something*? To most people who perform the experiment—and we should not restrict ourselves to philosophers who write about color—the afterimage experience does not appear to *merely* indicate the color orange in something like the way thoughts, words, concepts, or imagined images do (I'll comment on the latter below). Instead, the orangeness is spread out right on the afterimage itself. One finds oneself looking at a cow-shaped spread of orangeness, and the idea that the spread represents orangeness *without including anything*

really orange is observationally implausible. For most people, there is no need for an argument for the claim that the orangeness is actually instantiated in the afterimage experience. Instead, people tend to think that all one needs to do in order to see that orangeness is actually instantiated is just *look*. If a philosopher does the afterimage experiment, focuses her attention on the cow-shaped orange patch in the darkness, and still feels content to deny that anything at all in her experience is orange—so she is saying that there is nothing orange there—then she can pretty much convince herself of anything.

This is *not* an appeal to “philosophical intuition”, in any of the senses of that phrase. Instead, it’s an appeal to simple empirical *observation*. The observation in question has to be tempered somewhat, because as soon as one starts thinking hard about color one realizes that orange afterimage-experiences and orange pumpkins may not be orange in the same way (assuming pumpkins are orange; more on this issue below). My point here is that the advocate of the existence of X is not moved by any *argument*, such as the argument from illusion or hallucination. She is moved by her simple *observation* of a cow-shaped spread of orange in her experience: the idea that there is no spread of orange there is observationally refuted. It’s not the case that the realist about X is arguing along the lines of ‘If it visually appears that x is F, then something (perhaps not x) is F’ (more on that principle below).

The advocate of (1) could say that what makes the afterimage experience represent orangeness and cow-shapedness is some complicated story, such as something akin to Fodor’s about causal processes (Fodor 1990). The critics of (1) can accept that representation has a great deal to do with causal and/or other facts not open to introspection, but they will insist that the representationalists are ignoring the elephant in the room: *part* of the reason the afterimage experience makes one think of, or (what is different) otherwise represent, orangeness and cow-shapedness is the glaringly obvious one: when one is having the experience there is a really existing orange and cow-shaped thing that one is experiencing. This is part of the correct answer to ‘How does it come to be that the experience represents orangeness and cow-shapedness?’²

² Similar arguments show the inadequacy of the defense of (1) that runs ‘But the afterimage experience is an illusion; so, there is hardly any good reason to think there is anything orange there’. See also the remarks on Harman and Block below.

Ian Phillips (2012) views the matter differently. He thinks that according to realists about X “we cannot adequately characterise experience solely in terms of a subject’s apparent perspective on external, public reality”; he thinks the afterimage realist holds that afterimages “cannot be accounted for solely in terms of the ways in which apparent aspects of that world are presented to us” (2012, xxx). I think Phillips has mischaracterized the matter. The realist about X can admit that the representational aspects of the afterimage experience in some sense “exhaust” its philosophical interest. Perhaps the qualia property instances reduce, in some ontologically robust sense of ‘reduce’, to parts of representational property instances. All she has to do in order to admit these theses is to claim that the truthmaker for the representational story will include, as a part, X. Just because we can “adequately characterize experience solely in terms of a subject’s apparent perspective on external, public reality” doesn’t mean that that perspective does not include, as a part, the image X.

I am going to continue to present the arguments against (1) in a moment, but it’s worth noting here that, truth be told, the *real* argument for option (1), the line of reasoning that actually *moves* philosophers, has nothing to do with representation and goes as follows. First, the advocates of (1) think that options (2)-(4), to be examined below, are *highly* implausible.

2. X exists and is an external physical object: the surface of the light bulb perhaps.
3. X exists and is a non-physical object.
4. X exists and is an internal physical thing: some part of the eye or brain perhaps.

Very briefly, they think (2) can’t be right because the light bulb doesn’t exist when the afterimage X does (on the assumption that X exists at all); they think (4) can’t be right because no part of the eye or brain is orange and cow-shaped; hence, they think that realism about the afterimage (i.e., the denial of (1)) leads to the worst kind of dualism, view (3). But they also know that (1)-(4) are all the options; so they then grudgingly conclude that option (1) is the *least bad* view to take, since (2) and (4) are out and (3) is a disaster. Once a person has felt forced to settle for (1), the search for arguments in favor of (1) begins; that’s when some people start warming up to the representation-with-no-X view.

Hence, the above argument says that afterimage realism, the denial of (1), inexorably *slides* into dualism, which is view (3), because views (2) and (4) are empirically implausible; call it *the Slide*

Argument. We will see below that there are good reasons to reject one of the premises of the Slide Argument.

Gilbert Harman endorses option (1) (1990). He thinks that the sense datum theorists, who rejected (1), made a howling mistake. Suppose someone imagines or (what is different) hallucinates a four-legged unicorn. According to Harman, the sense datum theorists—Bertrand Russell, G. E. Moore, C. D. Broad, Edmund Husserl, H. H. Price, Roderick Firth, A. J. Ayer, and others—implied that the property of being four-legged, when we hallucinate or imagine a unicorn with four legs, is had by our imagining or hallucinating the unicorn—so we reach the absurd conclusion that our mental state or process has four legs.

It is very important to distinguish between the properties of a represented object and the properties of a representation of that object. ... [A]n imagined unicorn [this is a represented and nonexistent object according to Harman] is imagined as having legs and a horn. The imagining of the unicorn [this is the mental process or state] has no legs or horn. The imagining of the unicorn is a mental activity. ... The notorious sense datum theory of perception arises through failing to keep these *elementary points* straight (Harman 1990, 476; my emphasis).

Ned Block presents a similar charge against those theorists.

[I]t is no surprise that we describe the mental image as orange even though, strictly speaking, is it not. For it is easy to slip into ascribing to representations the properties of what they represent. People who work routinely with graphical representations of sounds (e.g., oscilloscope readings) often speak of them as if they had the properties of the sounds they represent—for example, being loud or high pitched (1983, 516-17).

Although I don't want to defend everything these philosophers would have said about X, there isn't any good reason to think those eminent philosophers failed to keep straight those "elementary points" Harman describes and made the foolish "slip" Block describes. I know that they occasionally articulated claims that made it look that way—but only if one ignores the surrounding text.

[A] person *A* is perceiving a material thing *M* which appears to him to have the quality *x*, may be expressed in the sense-datum terminology by saying that *A* is sensing a sense-datum *s*, which really has the quality *x*, and which belongs to *M* (Ayer 1940, 58).

However, the quality *x* Ayer writes of is understood to be highly restricted: it is a “phenomenological” or “sensible” quality. Indeed, his use of ‘appears’ is supposed to help here. Broad makes the restriction explicit.

Whenever I truly judge that *x* appears to me to have the *sensible* quality *q*, what happens is that I am directly aware of a certain object *y*, which (a) really does have the quality *q*, and (b) stands in some particularly intimate relation, yet to be determined, to *x* (my italics; Broad 1965/23, 89; cf. Price 1932, 3).

Ayer, Broad, Moore, Price, Russell, Firth, and Husserl (and, more recently, Frank Jackson: 1977, 89) wrote a great deal about color and shape properties in hallucinatory experiences because they had good reasons for thinking that *some* properties of the object one is hallucinating—the blueness of the unicorn, not the four-leggedness of the unicorn—are actually had by the hallucination-image. *They saw that color and shape were distinctive* (which is not to say that those are the *only* classes of distinctive properties). The sense datum theory arose not because of some elementary mistake or slip but because some philosophers saw that colors and shapes are markedly different from four-leggedness.

This is not to say that the case for the existence of *X* is founded on some principle of the form ‘If you have an experience that is phenomenally *F*, then something relevant is *F*’. Again, the main case for *X* is ‘Well, I just see it, plain as day!’

The realist about afterimage *X* need not be a sense datum theorist, with all the accompanying epistemological baggage. Neither need she say anything about hallucinations (since they are not the same phenomenon as afterimages, despite some similarities) or experiences of imagining. She’s not foolishly making any grand pronouncements about *all* afterimages, as the class is highly diverse (hence, the use of ‘some’ in my essay title). *All* she is doing is making the modest specific claim that for the afterimage experience described earlier, something satisfies (a)-(c).

It's obvious that the reason a person comes to think of a red dagger when seeing a drawing or photograph of one is that the drawing or photo usually literally contains something—a colored patch—that is dagger shaped (in the two-dimensional sense) and red. But as we have seen, precisely the same seems to be true for the afterimage. The picture contains no real dagger; daggerness is *merely* suggested by the picture. However, the picture does contain a red dagger-shaped thing (dagger-shaped in a 2d sense) and it's in virtue of the fact that the picture is really red and dagger-shaped that it *makes* me think of a red dagger. Similarly, it's in virtue of the fact that the afterimage experience involves an orange cow-shaped object that it *makes* me think of orangeness and cow-shapedness. Or so an argument against (1) says.

To say that X is orange is not necessarily to say that it's orange in the same way a pumpkin is orange, assuming for the moment that some pumpkins are orange. Perhaps 'x is colored orange' is polysemous; this is a linguistic claim. Even if it isn't polysemous, maybe there are several truthmaking ways for something to be colored orange; this is a metaphysical claim. The critic of (1) is merely saying that something existent is orange in some way that involves instantiation of *a* color property (so it's not mere representation akin to that of how 'orange' represents orange); she is also saying that the thing that is orange is also cow-shaped (in roughly the sense that a crude drawing of a cow is cow-shaped). This point about the potential dual nature of color will resurface a couple times below.

Critics of the representation-with-no-X view (when it is used to defend option (1)) need not hold that the view is false across the board, for all images. Contrast these two cases: (a) close your eyes and *imagine*—picture in your mind—an orange cow-shaped afterimage, and (b) actually *generate* an experience of an orange cow-shaped afterimage as described above. I do not know what is involved in case (a), the one with mere imagining. I suppose one would be generating, through the powers of one's imagination, an image M1 of an orange afterimage M2—where the orange afterimage M2 does not exist at all and the image M1 of it either is an existent brain token that isn't orange at all (or is so but only in a representationalist way akin to how 'orange' represents orange) or is entirely nonexistent. Either way, all there is in case (a) is the non-cow-shaped and non-orange neurological imagining experience of the nonexistent afterimage M2. So *perhaps* in case (a) nothing in my mind or brain is orange or cow-shaped.

However, it is plain that procedures (a) and (b) are quite different. We need to do (b) in order to get anywhere on this topic. Just because the representation-without-image theory *may* be plausible for

imagined images—I'm not saying it is; in the previous paragraph I just made room for that possibility—does not mean that it is plausible for our afterimage.

But forget color entirely for a moment: the case against the representation-with-no-X view is *stronger* when we set aside color entirely and focus on the shapes and spatial relations of afterimages.

Suppose you had looked at an array of three spherical light bulbs to generate three afterimages arranged as the vertices of an equilateral triangle, with each image roughly circular. The critic of (1) observes that it's very hard for most people to *look* at the arrangement of images (after they have closed their eyes and started having the afterimage experience) and deny that some things are circular and arranged equilaterally. It's much easier to make that denial when one has never looked at it. Suppose the diameter of the circles is about one third of the length of a side of the triangle. Even if the total afterimage experience *represents* all sorts of spatial properties and relations, it seems perfectly clear that there are things involved in the experience that really and truly *have* the spatial properties and relations themselves—and it's primarily in virtue of their existence that the experience does all that representing. After all, we can *see* the shapes very well.

Again, the challenge to the advocate of (1) is to account for the apparent spatial relations without saying anything that requires a really existing image with spatial relations. As before, there are plausible things to say about representation and imagination and belief dispositions, but that's the easy part. The hard part is to say things that don't, in their truthmakers, require existing images. It's so easy to slip into vague talk like 'Well, afterimage experiences are just apparent presentations of ordinary external physical objects (and sometimes extraordinary objects)'. The hard part is defending the key thesis that the "apparent presentations" don't include X. The realist of X can accept the apparent-presentation thesis—more precisely, she can accept some precisifications of it—while maintaining that the ontology of the truthmakers involved will include X. The same point holds for other ideas, such as classifying them as "illusions": the challenge is to argue that the illusion in question involves no existing image. *Some* visual illusions do not include any existing images. But what makes the experience of X so philosophically interesting—and is the reason why Husserl, Broad, Russell, Ayer, Firth, Moore, Price, and others were so adamant that X exists—is that however one classifies the afterimage experience, with 'illusion', 'appearance', 'presentation', 'apparent presentation', 'representation', and so forth,

I can think of one way that the claim that our afterimage is cow-shaped might be false, but as we can see it won't make a difference to afterimage realism:

Imagine you have two black circular flat disks standing on their edges on a table in front of you, so they are vertical. One of them is bigger than the other. Now imagine someone cutting each of them in half and for each disk discarding one of the halves. So now we are left with two half-circles, one larger than the other. They look like this when they are standing up vertical on the table:



Now imagine arranging them so that one is a foot directly in front of you, the other is two feet directly in front of you, but they are lined up in such a way that to your eye they form an entirely homogeneous black perfect circle: the smaller half-disk is on the right, the larger one is on the left, but the larger one is far enough away from you that it looks the same size as the smaller one and lined up in such a way that they seem to form a whole circle. In this case, it only looks as though there is a *single* circular thing in front of you.

Hence, it's *possible* that the orange cow-shaped image isn't really cow-shaped but is really several images lined up to just look that way. Even so, I doubt that *our* afterimage is like that (never mind the question of whether any *other* afterimage might be like that; the class of afterimages is highly diverse and God only knows how it can be extended in highly creative ways). I'm not saying that our afterimage can't be several images lined up because it is a single two-dimensional object, unlike images lined up. In fact, I suspect the afterimage isn't two-dimensional at all, even approximately, for reasons I'll get to when examining option (4).

However, even if I'm wrong, and our afterimage is really several images together, that would only mean that there are several images of various shapes. Option (1) would still be false. Henceforth, I will simply assume that if our afterimage exists at all, it is singular and cow-shaped.

Although the critics of (1) are taking the commonsensical position on the afterimage—there really is something there that’s orange and cow-shaped—they need not be at all motivated by a dedication to common sense. They are not arguing ‘According to common sense, there are afterimages; when a proposition is commonsensical, there is enormous warrant for it; there is little reason to reject common sense in this particular case; thus, we should reject (1)’. Indeed, they might be the type of philosopher who rejects common sense in many areas. (I can serve a proof: I reject (1), I reject Moorean responses to anti-commonsensical philosophical arguments, and I even endorse some anti-commonsensical philosophical theories.) To see this, consider some other views that contravene common sense.

The compositional nihilist says that there are no composite objects; trees, if they existed, would have to be composite; thus, there are no trees. The eliminative materialist says that no one believes anything. In each case there is a ‘but of course’ thesis. The nihilist says there are no trees but of course where you think there’s a tree there is *something*: a whole bunch of mereological simples in a tree configuration. The eliminative materialist says you didn’t take out the trash because you believed the trash gets picked up today, but of course where people think there are beliefs there is *something*: a whole slew of cognitive states and processes that cause your behavior but do not have what it takes to be beliefs. These anti-commonsensical philosophers always find a substitute for the thing they are denying existence to: the nihilist substitutes pluralities of particles for trees, the eliminative materialist substitutes theoretical cognitive states for beliefs. The problem with the advocate of (1), which does not apply to the other anti-commonsensical philosophers, is that she has no plausible substitute, no reasonable ‘but of course’ thesis. She can try to say that although X fails to exist there is *the experience of X*, which really does exist and can serve as the substitute. But as soon as we inquire into what that experience is, as we saw above it seems that it has to involve something that satisfies (a)-(c). The lesson is that even if you are welcoming to anti-commonsensical theories, you can still find good reason to balk at (1).

For what it’s worth, my experience suggests that in almost all cases it is very difficult to get non-philosophers on board with (1). When a person actually *generates* the afterimage experience, and *attends* to it, they almost inevitably think it’s obvious that there was something cow-shaped and orange. They are of course hesitant to admit that it’s physical or that it’s “objective”. But the idea that there is *nothing whatsoever* there that’s colored—nothing subjective, nothing illusory, nothing non-physical, nothing *at all*—is something they almost always reject. They think that although the “something” in question may be ephemeral, temporary, fuzzy, perhaps non-physical and ultimately mysterious or

irrelevant, it seems as certain as anything ever gets that it was *there* when they closed their eyes, that it *existed*, and was obviously orange in some way not at all like how ‘orange’ represents the color orange (that’s the business about orangeness being “spread out”).³ When one has the afterimage experience upon closing one’s eyes, *something* is “lit up”, they claim, even if it’s difficult to say what it is. Upon closing one’s eyes *the darkness is interrupted by a colored expanse*; simple observation is sufficient to establish that small but crucial point. Again, maybe the image isn’t colored in the very same sense that an ordinary external object is colored, but it’s obvious that it is colored in a very robust way—if anything, it’s colored in a way more robust than that of an ordinary material object such as a pumpkin. Or so it appears.

We have seen that option (1) faces an uphill battle. I don’t reject it myself, but I do think there are two strikes against it. First, it is contrary to visual experience, as it seems as though that when we do the afterimage experiment we can see perfectly well that something is colored and shaped when we close our eyes. Second, the option (1) advocate has to defend not just a positive claim (e.g., ‘What makes the afterimage experience so similar to the experience of seeing a blurry colored object in the dark, when it comes to color and/or shape, is completely exhausted by facts about representation’) but a crucial negative claim (e.g., ‘What makes the two experiences so similar does not involve any existent orange, pumpkin-looking thing’, ‘The apparent presentation/illusion includes no existing colored object’), and the negative claim is very hard to defend, as most attempts use terms (e.g., ‘apparent presentation’, ‘illusory experience’) that give us no reason to think there is no object X involved as a part.

Option 2: The Afterimage is an External Physical Object

If one rejects option (1), then one is admitting that something, X, existed from 4:00:01 to 4:00:10. But that means X can’t be the light bulb (or the surface of the light bulb), since it was destroyed at 4:00:01. This criticism also shows that X can’t be some light waves either: your eyes are closed and there are no light waves coming from the light bulb anymore.

³ The philosophers of perception mentioned earlier were just as vehement about the existence of such images (e.g., Moore 1965/1957, 134; Price 1932: 3, 63; Broad 1965/1923: 89-94).

What about saying that one is experiencing the light bulb even though it no longer exists? So 'x is currently experiencing y' can be true at a certain time even when y no longer exists at that time.

That's fine: in some sense when you're having the afterimage experience you are "experiencing the light bulb" even though the light bulb no longer exists. But that issue doesn't matter to the ontological point under investigation. The question we're focusing on isn't "What were you experiencing while having the afterimage experience?" The question is "What is X?"

Option 3: The Afterimage is Non-physical

Some people find themselves tempted by the idea that X had to have been a *non-physical object* that (a) was something you experienced, (b) was cow-shaped, and (c) was orange. And that would prove that aspects of our sensory life are non-physical even though colored and having certain shapes!

For what it's worth (maybe not much), most people who have investigated these issues think this option is unlikely to be true, for several reasons:

- If the afterimage is caused to exist by physical processes, then it sure seems that it's got to be physical as well and located more or less where its physical causes are. And yet, option (3) is saying the image isn't physical and isn't located in physical space.
- If it has shape and color, then it's got to be physical. And yet, option (3) says it's not physical.
- The whole notion of non-physical aspects of the mind are fraught with difficulties that philosophers have discovered over the centuries (that I won't go over here).

Even if one isn't a physicalist, because one believes in gods or ghosts or abstract objects or even immaterial human souls, it sure seems that *when it comes to human visual sensation*, there aren't any non-physical tokens even if there are non-physical properties (so a version of property dualism is true). I don't endorse these arguments against (3), but many will.

A very different way to fill out option (3) is to hold that X is *abstract* (neither temporal nor spatial). But this is highly implausible for three reasons. First, it's pretty clear that (if X exists) it has a temporal

existence: it comes into being and fades away. Abstracta are usually thought to not have temporal properties like that. Second, X is visually experienced, as per condition (a) in the characterization of X, and it is difficult to see how one could visually experience an abstract object (e.g., we may have cognitive access to numbers but Platonists don't think we *visually* experience such objects). Third, X has spatial properties and relations. For instance, it is cow-shaped in the sense described earlier; and if one has several afterimages at once, then there can be spatial relations among them. The images might not be in physical space, as the first way of filling out option (3) says, but they surely have spatial properties if they exist. Hence, it is quite doubtful that X is an abstract object.

Option 4: The Afterimage is a Physical Part of Your Body

There are just two physicalist options for afterimage realism: the image is either an *external* physical thing or an *internal* physical thing. We already saw, on straightforward empirical grounds, that the first idea is unlikely (that was option (2)). But perhaps some physical part of your eye or CNS (central nervous system) generally was cow-shaped (again, in the manner of a drawing of a cow), orange-but-not-red, and was the thing you were experiencing: the afterimage X is just an array of cells. If so, then the second physicalist idea could work. That's option (4).

Almost everyone will object that empirical investigation shows that no part of your eye/CNS is cow-shaped. They will also insist that empirical investigation shows that no part was orange, then red, then pink, and then violet—which again is inconsistent with identifying the image with some internal physical thing. And that seems to be the end of the matter: because option (2) is no good, we are left with (1), (3), and (4); but as we just saw (4) is no good either; so we are left with (1) and (3); hence, if we reject (1) then we are left with dualism, (3)—precisely as the Slide Argument said.

Not so fast. When you have the afterimage experience, you are experiencing—some philosophers find 'looking' and 'seeing' a little odd here—a part of your body, which is object X, and experiencing orange. It's true that if an external observer were to look at X, she would not see orange. (Here we pretend that she can *look* inside you; alternatively, change the example to one in which you have an afterimage experience with your eyes open, so people can easily examine at least your eyes.) However, this is not surprising: you are viewing X in media utterly different from that of anyone else: you are seeing (or, if you prefer, experiencing) part of the inside of your body without looking in the usual way. Due to your

unique access to your own eye/CNS, it's no surprise that no one other than you experiences the color you experience when they look at your eyes. We already know that an object can appear different colors depending on the media through which one sees it (e.g., a fish looks to be one color in the ocean and another color when brought out of the water). In fact, it's probably a stretch to say you are experiencing your afterimage "through a medium", at least in any ordinary way.

More carefully, we should not take any position on X's "real" color, provided we are being forced to use 'real color' so that an object can have just one "real" color (all over, at a specific time). To very briefly see the difficulties in thinking that all objects have "real" colors, suppose a fish looks purple to other fish in the water in which it lives but blue to us when taken out into the sunshine; suppose further that one can see the details of the fish's scales best when it is in the sunshine. If that's the way things are, then there are reasons to think it's "really" purple (as that's the way it looks to other fish in its natural environment) but there are also reasons for thinking that it's "really" blue (as that's the way it looks in an environment that allows maximal discrimination of its surface). Maybe the right conclusion is that it has no "real" color. Let's not take a stand on that issue, regardless of the details of the specific example. The advocate of option (4) could do the same thing with afterimage X: it is orange to its owner and red, say, to an external person, but we go agnostic on the issue of its "real" color. The important point here is that X can be orange, at least temporarily, even though many visually unimpaired people don't see orange when they look at it at the relevant time.

So much for the objection that goes 'But nothing in the relevant body parts is orange'. It isn't that much harder to figure out why other people don't see the shape you see when looking at your afterimage X. If X is part of your body, and it's cow-shaped (in the sense that a drawing of a cow is cow-shaped), then when people look at the X part of your body they should be able to detect the cow-shapedness. Can they?

Well, even if they can't, that doesn't mean they aren't looking right at X anyway. Consider this array of letter 'O's:



Let T be the triangle of yellow ‘O’s. If you couldn’t see the contrast between the yellow and black ‘O’s, if you were blind to it, then although when looking at the array you would be “visually experiencing” T in one sense, as you’re looking right at it, in another sense you would not because you would not isolate it from its surroundings.

Perhaps that’s what happens to people when they look at your eye/CNS. X is right there, and they are looking right at it. X is just an array of cells—just like T is an array of ‘O’s—and they are seeing the cells. But they can’t distinguish X from its surroundings—they can’t see its shape—because the main thing that distinguishes it is the fact that it, but not its surroundings, is orange, and they can’t see the orangeness that’s there because of difference in viewing circumstances noted earlier.

Actually, external observers probably *can* distinguish X from its surroundings by seeing its cow-shape: presumably, there’s some straightforwardly physical property P, that a future scientist could find, which is instantiated in each of the cells in X but which is not instantiated in the cells surrounding X. This would be the case if the property of being orange that X has was determined by some (complex of) lower-level properties. A scientist could discover that just the cells in X have P; this would allow her to zero in on X via its shape; and perhaps she could learn of the connection between P and orangeness in order to conclude that X is orange to you. Even so, we can suppose that she is unable to “just see” that the X cells are orange, just by looking at them. Only *you* can “just see” that part of *your* eye is orange (assuming X is part of the eyes instead of some other part of your CNS). The scientist would have to learn it through testimony or scientific investigation.

Earlier I suggested the possibility that our afterimage isn’t cow-shaped: what’s really there are several images arranged in such a way as to give the illusion of a singular cow-shaped object. Now that I’m suggesting the afterimage is an array of cells, it should be clear that the image is not two-dimensional,

even approximately (cells aren't two-dimensional). I will continue with the assumption that the afterimage is genuinely cow-shaped (like how T is triangular) and not the clever result of multiple cell arrays arranged appropriately as described earlier.⁴

It won't do to object to option (4) by saying that it's impossible to experience parts of one's eye. Larry Hardin pointed out long ago that some of the anomalous objects we visually encounter are literally in the eye.

It is also possible to see directly many objects and processes inside one's own eyes. They include the "floaters" in the vitreous humor, the macular pigment, the blood vessels in the retina, and "Purkinje arcs," which are probably the result of electrical discharges in the optic bundle coursing across the surface of the retina (1988, 95).

Although in that passage Hardin uses 'see', the advocate of (4) need not say that we literally see the part of the eye that is the afterimage. Even if 'visually see' is polysemous, it may well fail to indicate the relation a person has to her afterimage when she is, well, attending to it. This all depends on the semantics of 'see', which need not detain us. The advocate of (4) is saying that the person having the afterimage experience is "experiencing" a part of her body; the open-endedness of 'is experiencing' suffices here even if 'is visually seeing' does not.

I have been noncommittal regarding where X is: the eye, the brain, or what? I think that will depend on the afterimage in question; a similar point would hold for hallucinatory images (phosphenes, rainbows, holograms, etc.) that we want to be realist about. Let scientists figure out the locations. This makes option (4) hostage to the empirical facts, but this area of philosophy is hardly a priori.

⁴ One could hypothesize that X is an internal *process*, and not an array of cells, but I have a hard time understanding how a process can be cow-shaped. Against this objection, it could be said that a cow running in a field is a process, one that has a part—in some sense of 'part'—that is cow-shaped (the cow). The advocate of 'X is a physical part of the body' option (4) could accept this idea—by modifying 'of the body' into 'of the body and its processes'—but then she has to find the part of the body that is cow-shaped, just like in the running cow story. So the requirement to find the orange cow-shaped thing has not gone away, and an array of cells (or a temporal part thereof) seems like a natural idea to pursue.

An odd consequence of this way of developing option (4) is that some afterimages are *fully objective entities*. They are arrays of *cells* in one's body: physical and publically available to investigation. They exist even when not colored as in the afterimage experience. When the afterimage experience has faded away completely, so with your eyes still tightly closed you are experiencing as much darkness and as little color or light as possible, X is still there. You just no longer see its boundaries. Alternatively, one could say that X is a restricted temporal part of the array of cells, so that X exists only while you're having the afterimage; in that way we preserve the idea that afterimages are fleeting. In either case, the main thing that is subjective about the afterimage is this: only you were able to "just see" that it was orange; anyone else would have to figure it out, as described above.

Another oddity of this view is that it suggests we are highly fallible about afterimages. Indeed, we are more fallible about them than we are about familiar objects such as pumpkins. Most of us don't think of afterimages as existing independently of our experiences of them, or as material or as publically available to perception. Students typically think of them as not "really" colored, shaped, or existent. If my teaching experience is at all representative, what they "mean" is that afterimages aren't ordinary material objects that lots of people could investigate. And that's what my version of option (4) is denying.

None of this defense of (4) is intended to hold for *all* afterimage experiences, any more than observations about rabbits should be taken to apply to all mammals. The use of 'some' in this essay's title is not superfluous. Afterimage experiences (even restricted to the visual) form a highly diverse group, and there is no reason to think that one should be a realist about all of them (denying (1)) or adopt (4) for all of them. Neither should we necessarily apply what I've said about some afterimages to similar visual cases, such as hallucinatory images, rainbows, the sky, holograms, phosphenes, etc.

The experience of the image probably is some complicated thing involving "input" from the cortex in the attending to the image. There is still the image itself and the experience of it. My way of developing option (4) offers no insight into what the "experience" of the image is.

So far, so good, perhaps. But suppose the scientist experiences red when she looks at X, while you experience orange. That raises the question: is the red patch she experiences, P_R , identical to the orange patch you experience, P_O (assuming her patch exists)?

This is an issue regarding not just (some) afterimage experiences but veridical perception, which I treat in a different essay. But for now, here's an answer: P_R is distinct from P_O , since P_R is part of *her* body while P_O is part of *your* body. Hence, when the scientist looks at X , the red patch she is experiencing is part of her body, and thus not X . So we're saying that in *some ordinary veridical visual perception* the color patches we experience are in our own bodies, and not on (or identical with) the surfaces of ordinary external objects. (The semantics of 'experience' is generous and annoying enough so that 'The scientist experiences X ' and 'The scientist experiences part of her own body' both come out true.) This idea is undoubtedly counterintuitive to those unfamiliar with the oddities of veridical visual perception, but those so informed should not find it counterintuitive (which of course is not to say that the idea is true).

Moreover, option (4) should not be saddled with implausible theses along the lines of 'When in ordinary visual perception one sees an orange pumpkin, what's actually happening is that (a) one is seeing or perceiving an internal physical object, and (b) one is inferring something about the pumpkin'. No, we need not accept either (a) or (b): there's no solid reason to think we ordinarily *see* the internal object in anything like the way we see pumpkins, and there's certainly no reason to think any process of inference occurs or has to occur in order to get justified beliefs in pumpkins. And of course there is no reason to wildly generalize to other aftereffect phenomena. Let's avoid bad epistemology.

I do not endorse this or any other way of developing option (4). Even so, I think it is a promising response to the afterimage conundrum. It deserves to be elaborated upon, especially since it has some significant virtues:

- It's physicalist at the level of tokens (unlike option (3)): afterimages and other color patches are physical things in the body.
- It's consistent with ordinary empirical observation (unlike option (1)) and science (unlike option (2)).
- It is consistent with the idea that each shade of color is a single property, so the apparent unity of shades of color can be preserved.

- Each color property may be a first-order physical property instantiated only in the eye/CNS. So it *can* be physicalist at the level of properties too, although one *need* not accept this view, as one might hold that they are emergent, primitive, etc.
- Ordinary external objects satisfy ‘X is orange’ just by courtesy (i.e., in a derivative manner): pumpkins, sources of light, holograms, transparent material volumes, parts of the sky at certain times, etc. The truth conditions for ‘X is orange’ are exceedingly complicated, just as we have always known, because whereas parts of the eye/CNS satisfy it in virtue of instantiating a color property (the property being one of the shades of orange), other objects satisfy it in virtue of being appropriately causally related to the instantiation of those color properties—but the causal relations are diverse, complicated, and often indirect. This is *why* we have been unable to locate color properties outside the head: there is no unitary phenomenon of orange out there. ‘X is orange’ is polysemous.

It’s a good thing that option (4) has these virtues: there are only four possible options for X, option (2) is easily refuted, option (1) is contrary to simple observation and lacks a decent defense of its crucial negative claim, and option (3) is metaphysically implausible (or so most philosophers think).

This essay is meant to merely *present* the ontological problems with color patches that philosophers of color have tended to neglect recently; I am not out to describe all the solutions or defend my favorite.

The Afterimage Paradox

We have seen that all four options for answering ‘What is X?’ have problems: for each one, there are serious reasons to think it just can’t be right. But one of the views has just *got* to be right, no? Hence, we are faced with a paradox: one of the four options has got to be true, but for each one there are excellent reasons to think it’s false.

There are seven facts that make the paradox about afterimages particularly worrisome.

First, it can be fully presented without relying on any of the currently popular yet questionably coherent terms ‘phenomenal character’, ‘qualia’, and ‘what-it’s-like’. Many philosophers are skeptical that much of anything truth-evaluable can be said in such terms—but as you would expect, almost none of them

publish on these topics, so their skepticism goes largely unheard. By avoiding those terms and their synonyms in our presentation of the afterimage paradox, we avoid those worries.

Second, we did not need to appeal to troublesome yet ordinary terms such as ‘perception’, ‘illusion’, ‘appearance’, ‘presentation’, ‘consciousness’, or ‘awareness’. There’s a real threat that even under expert disambiguation they remain polysemous, which raises the probability that controversial arguments employing them equivocate in subtle ways. By avoiding those concepts in our arguments, we avoid those possibilities of equivocation. In addition, we didn’t have to struggle with definitions of ‘afterimage’, ‘experience’, or other troublesome terms we did employ. We stuck with a particular ordinary afterimage experience, one sufficient to reveal the paradox. Indeed, if we had desired it, we could have run through all the arguments without ever using the term ‘afterimage’. So we avoid the potential problem of having our arguments undermined by relying on flawed definitions or principles whose expression uses those terms.

Third, we didn’t have to resort to *ideal* images. For instance, although for many of the above arguments we could have used hallucinations in place of afterimage experiences, there would be no need to fantasize about the philosophically perfect hallucinations: the ones introspectively indistinguishable, even in principle, from ordinary veridical perceptions. Even if hallucinatory images are always easily distinguishable from perceptions, using nothing but introspection and ordinary effort (this is probably false, as some cases of schizophrenia suggest), we would still need to find a place for such images in our ontology, and that would be sufficient to raise the difficult ontological conundrum. And of course we could just stick with the one afterimage experience anyway.

Fourth, we didn’t have to say anything about other kinds of aftereffects, such as auditory or gustatory ones, for which theorizing is often more difficult due to lack of familiarity (both scientific and introspective).

Fifth, the question we have been addressing, ‘Does X exist, and if so, how does it fit into the world?’, is independent of the answers to two of the key questions in the metaphysics of color: ‘Are ordinary material objects colored?’ and ‘How are color properties ontologically related to more familiar, straightforwardly physical properties?’ Regarding the first, we didn’t assume that pumpkins, for instance, are colored and we didn’t assume that they aren’t colored. Regarding the second, we made no

assumptions regarding whether colors are primitive properties, first-order properties that are straightforwardly physical, reflectance types, or anything else. Continuing on that theme, we made no claims about the alleged *intrinsic* nature of afterimage colors. We made no claims about the supervenience of color properties on straightforwardly physical properties. We said next to nothing about the truth conditions for ‘X is orange’—other than arguing that it is satisfied for afterimages. This means that the ontological conundrum about color patches is a problem for just about everyone.

Sixth, we did not rely on any controversial epistemological principles. For centuries philosophers have argued about afterimages using questionable epistemological premises, as in the Argument from Hallucination for instance (e.g., Macpherson and Platchias 2013). We have not done so.

Seventh, much of our argumentation need not even appeal to color, as odd as that may seem in an essay about afterimages. As we saw above, arguments regarding the shapes and spatial relations of afterimages are enough to generate the ontological conundrum regarding afterimages.

Here’s what have we proven: the truth about afterimages, and as a consequence color *and shape*, is very strange and counterintuitive. We don’t know *what* the truth is, but we know that whatever it turns out to be, it will be astonishing.

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