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# FALSE REFLECTIONS

by Maarten Steenhagen

Standing in front of a bathroom mirror, looking straight ahead, you seem to see your own face. You seem to be able to look at your countenance from where you are. But of course your face is not *there,* where you see it; it is not on the other side of the mirror. It is where you are, on *this* side of the mirror. That should be obvious to anyone familiar with mirror reflections. Some, however, take this to be one respect in which mirror appearances are illusory. They deem it obvious that what you see in an ordinary plane mirror appears to be over there, behind the mirror's surface, while it is not in fact located there. For this reason they take mirrors to introduce some kind of optical illusion to visual experience. Call this view *specular illusionism*.[1]

Specular illusionism may seem like an entirely natural position to arrive at. Yet its naturalness obscures the possibility of reasonable disagreement over whether this view is plausible or even correct. Here I will show that the specular illusionist's claim rests on substantive assumptions about how things must appear to us; assumptions that fall within the purview of philosophical catoptrics, the philosophical study of the optical properties of mirrors. Enga-

[1] What I here call 'specular illusionism' is a specific version of the view that mirror appearances are illusions. There are other versions of this view, because there may be other reasons to think mirror appearances are illusory. For example, many think that mirrors give an illusion of left/right reversal; see Block 1974.

ging with this issue helps to correct a common misconception about how mirrors contribute to visual experience.

Here is the plan. I will argue that we have no compelling reason to accept the idea that mirror reflections are illusions of the locations of things. The idea that we have such a reason is rooted in a confused conception of the relations between location, direction, and visibility. The main contribution of the paper is that it brings out that seeing a thing without looking in its direction is only illusory in certain suboptimal conditions. Explaining why this is so will reveal why philosophical catoptrics is relevant to our understanding of vision and visual appearances: mirrors make a contribution to the phenomenology of vision that cannot be reduced to the contribution made by more common visibilia.

To reach my conclusion I will have to engage in the somewhat puzzling enterprise of arguing about appearances. It is not always easy to use philosophical reasoning to establish something about superficial phenomena such as the way things look or seem (cf. Martin forthcoming). But I will show that at least in the case of mirror appearances there are good ways to justify some descriptions of how things appear, and to resist others. I will begin by characterising more precisely the claim that mirror appearances are illusory, and identify the specific assumptions that motivate it.

## 1. A puzzle about mirrors

It seems obvious that mirrors make a specific contribution to the visual world around us. Yet philosophers of perception rarely take mirror perception to tell us something new or distinctive about vision more generally.

Physically, mirrors are opaque surfaces that reflect incoming light specularly, which means that light from a single incoming direction is not diffused or scattered (as with matt opaque surfaces) but reflected into a single outgoing direction.[2] But to know how the physical properties of mirrors affect the behaviour of light is not yet to know how mirrors impact on the phenomenology of human vision. The physical facts about optics do not wholly determine their phenomenological impact.[3]

My interest here is in a phenomenological claim and not a physical one. Specular illusionism is a view about the contribution mirrors make to the character or phenomenology of vision.

It is not hard to find examples of philosophers attracted to specular illusionism. Take the simple example with which I began. In the morning you stand in front of your bathroom mirror. You inspect your face for traces of sleep. Zeno Vendler writes about this situation that "the mirror image of my face appears behind the mirror, yet there is nothing there but bricks" (Vendler 1994, 322). He thinks that, to that extent, mirrors fool us. Austen Clark similarly writes that "there is a sense in which objects reflected in a mirror look as if they are arrayed behind it" (Clark 1996, 490).[4] Clark assumes that this is an illusion due to the nature of reflection. Roberto Casati reconstructs the view these authors seem drawn to as follows:

> what we see in the mirror is a portion of the world: but in virtue of the deviant causal chain, we represent that portion as if it were situated in a different place from where it is in fact located (for instance, on the other side of the wall in the hall

[2] For plane mirrors, the reflected rays lie in the plane of incidence, and incident and reflected rays make equal but opposite angles with the perpendicular to the mirror (Katz 2002).

[3] Vivian Mizrahi (forthcoming) rightly emphasises that phenomenologically speaking, mirrors are likely to be more complex than the physical story alone would suggest.

[4] We can also understand the situation in broader terms, as the experience of seeing a space opening up before us when we look in a mirror (Casati 2012, 196, Mac Cumhaill 2011).

> where the mirror hangs, which we know to be the entrance to the neighbors' apartment, not ours)…. At first pass, the content of perception of an object reflected in a mirror is therefore mistaken or illusory. (Casati 2012, 196)

Because mirrors redirect the otherwise straight path of light, they make objects and spaces appear to us as if they were situated in places distinct from where they are in fact situated. Or so the thought goes.

This conviction is not only prevalent in philosophy. In psychology, Marco Bertamini's team has contributed significantly to our understanding of the 'folk optics' of mirrors. Studying lay people's behavioural responses and reports, they have uncovered robust patterns that reveal our tacit grasp of how mirrors contribute to the visual world. Yet their research is also in part based on the assumption that what people react to is "a 3D scene … perceived on the other side of the mirror" (Bertamini, Lawson, and Liu 2008, 277).

What could motivate the specular illusionist? The mere physical facts are insufficient, because their phenomenological claim is more than a simple re-description of how mirrors reflect light specularly; it is a claim about how the situations in which these physical facts obtain appear to human perceivers.

Nor could the specular illusionist be motivated by behavioural evidence of people engaging with mirrors. There is little mileage in defending this view on the assumption that people are invariably fooled by mirrors. Typically, people are precisely not fooled by mirrors. No doubt mirrors occasionally trick us. In magic shows, for instance, mirrors are in large part responsible for the appearance of the impossible.[5] At points a magician's mirrors may lead you to

[5] Jason Leddington suggested to me that the distinctive aim of theatrical magic is to produce illusions of impossible events.

believe, wrongly, that things are located where there are not. Casati has called viewers in such situations 'epistemically innocent': they are looking in a mirror but for some reason they remain completely unaware of that fact (Casati 2012). People are rarely innocent in this sense. In most of our encounters with mirrors we are fully aware of what is going on, and feel no inclination to act as if what we see in the mirror is located behind it.

The specular illusionist can grant all this and still maintain that mirrors, even in the most mundane circumstances, nonetheless have something deceptive about them. Whatever else happens, mirrors may still fool us *visually*; their influence on us may be strictly limited to how things look. That would still suffice for an illusion of sorts. That type of illusion does not arise because the mirror has been cunningly situated—it may be right there in plain sight on our bathroom wall. It arises exclusively at the level of appearances.

So understood, there is something puzzling about the kind of effect the specular illusionist attributes to mirrors. How can an appearance be deemed misleading if it does not in fact mislead? The only way to motivate such a claim is as a claim of introspection. In other words, we must understand the claim that mirror appearances are illusory as a first-personal claim about one's visual experience with mirrors. Supposedly, everyone should be able to verify such a claim for themselves: "Don't you agree? What you see in a mirror appears in a location that you know it is not". We are invited to accept this description of how things seem to us when we look into a mirror—a description that can be apt even though we typically know full well that things are not as they appear.

Many authors are convinced that visual situations like this are possible, so at this point we may have no reason to reject the description off-hand. Many characterise stock examples of illusions in just this way: as situations in which the appearance of a state of affairs may per-

sist despite our conscious knowledge of the contrary. Gareth Evans expresses this conviction as follows:

> It is a well-known fact about perceptual illusions that it will continue to appear to us as though, say, one line is longer than the other (in the Müller-Lyer illusion) even when we are quite sure that it is not. (Evans 1982, 123)

Evans' statement helps us get a better grasp on the claim the specular illusionist advances. They in effect group mirror appearances under the heading 'perceptual illusion' as characterised by Evans. For example, Clark's claim that "there is a sense in which objects reflected in a mirror look as if they are arrayed behind it" offers precisely such a specification. Clark here maintains that despite our knowledge that what we are seeing is not arrayed behind the mirror, it will continue to appear to us as though the objects we see are so arrayed. It is on the basis of this diagnosis about how things appear that the specular illusionist concludes that mirror appearances are illusory or misleading. The visual illusion occurs purely at the level of the phenomenology of vision. As one could put it, though we ourselves aren't fooled, our eyes are.

## 2. Optical illusion

So far I have considered the seemingly natural claim that mirror appearances are illusory because they make it look as if the object that appears is behind the mirror. We can now present the motivation for this view about mirror appearances as an amalgam of three assumptions:

A. If something appears to be some way while it is in fact not that way, then its appearance is at least to that extent illusory.
B. The objects we see in a mirror appear to be located behind the mirror.

C. The objects we see in a mirror are not located behind the mirror.

All three claims seem plausible. The first is about the nature of illusion, and how it is strictly grounded in how things appear to us. The second is a purely phenomenological claim: a characterisation of how things look to us when we see something in a mirror, independent from how we subsequently respond to this appearance, or from what we think about the situation we are in. The third is empirical, about where the object we see in a mirror is in fact located.

Having identified the motivation for specular illusionism, we are now in a position to assess whether we should be compelled to accept the view. Should we accept each of the assumptions that underpin it? For the purpose of this discussion I will accept the first, but I do want to briefly explain the claim about illusions that it embodies.

It is common to think of illusory appearances in terms of a specific kind of experience. A visual illusion is a visual experience of an object *o*, appearing to be some way *F*, where *o* is not in fact *F*. Think of one of those well-known motion illusions, such as Akiyoshi Kitaoka's *Rotating Snakes*.[6] Looking at that figure, at least for brief moments, the colourful disks before you appear to be in motion, while they are not in fact in motion. Especially when viewed on a computer screen, it may seem hard to tell whether you are looking at a still graphic or an animated GIF. Even if you know that you are looking at the former, and so know that the shapes do not move, they nonetheless continue to *appear* to move. On the current understanding of illusion, the appearance of such figures is to that extent illusory.

[6] To see *Rotating Snakes* and several other peripheral drift illusions, see Kitaoka's website: http://www.ritsumei.ac.jp/~akitaoka/index-e.html

The same can be said about the Müller-Lyer illusion as discussed by Evans. When we look at the Müller-Lyer lines, one line will appear to be longer than the other, despite our knowledge that the lines are in fact of equal length. Here too, such facts about the situation suffice for the appearance of the figure to count as illusory. Both *Rotating Snakes* and the Müller-Lyer lines can introduce a genuine tension in our experience between what we know and what we see, one that should be of interest to anyone studying perception. Hence, there is some point to classifying appearances that fit this characterisation as illusions. It captures a relevant sense in which appearances can be said to be illusory.

The specular illusionist is convinced that mirror appearances are illusory because they give a misleading visual impression of a reflected object's location. I have explained why this claim must be based on introspection, and have explained the conception of illusion that it presupposes. We can flesh out this line of reasoning in even more detail by showing how the earlier three ideas naturally come together to form an argument.

1. If something appears to be some way while it is in fact not that way, then its appearance is at least to that extent illusory (A).
2. If the objects we see in a mirror appear to be located behind the mirror and they are not located behind the mirror, then their appearance is, at least to the extent of their apparent location, illusory (from 1, a fortiori).
3. The objects we see in a mirror appear to be located behind the mirror (B).
4. The objects we see in a mirror are not located behind the mirror (C).
5. The appearance of the objects we see in a mirror is, at least to the extent of their apparent location, illusory (from 2, 3, and 4).

This argument is valid. If we want to resist the view that mirror reflections are illusions, and if we go along with the view of illusion on which it relies (as expressed in 1), then we must reject either the third or the fourth premise.[7] These premises embody two philosophical assumptions about the optical properties of mirrors.

Assuming that this argument captures the motivation of the specular illusionist, in the rest of this paper I will consider both strategies. The first strategy I will discuss denies the fourth premise and so refuses to accept (C), that the scene we see in a mirror is in fact not behind the mirror. A proponent of this strategy must make it plausible that what we see in a mirror is located behind the mirror. As I will show, this strategy may seem attractive to those enchanted by the way in which geometrical optics models mirror reflection. The other strategy denies the third premise (refuses to accept B), namely that the scene we see in a mirror appears to be behind the mirror.

To look ahead, in the end I will favour the second strategy, and suggest that we should resist the idea that the objects we see in a mirror appear to be behind it. I will motivate this by distinguishing more precisely the relations between location, direction, and visibility. But discussing the first strategy is nevertheless instructive. Critical reflection on this move reveals some of the elementary distinctions that are needed when thinking about the optical properties of mirrors.

### 3. Alice and the theory of virtual images

Hold something up in front of a mirror, and ask yourself where what you see in the mirror is located. The first strategy maintains that what you see in the mirror is located behind it, such that if it appears to be over there the appearance could be veridical. But why would someone

[7] I take the inference from 1 to 2 to be entirely straightforward.

go along with this idea? What you hold up is surely in your hand, and not behind the mirror. One would need to posit some additional thing, and assume that this is what you see when you look in a mirror.

Lewis Carroll, in *Through the Looking Glass* (1871), describes one way of pursuing this strategy. Alice arrives at a distinctive catoptrical theory when she concludes that the mirror in her room gives her a view on a distinct space located on the other side of the looking glass:

> I'll tell you all my ideas about Looking-glass House. First, there's the room you can see through the glass—that's just the same as our drawing room, only the things go the other way. I can see all of it when I get upon a chair—all but the bit behind the fireplace. … Well then, the books are something like our books, only the words go the wrong way; I know that, because I've held up one of our books to the glass, and then they hold up one in the other room.

Alice thinks that the mirror makes visible a collection of material objects located behind the looking glass, distinct from the collection of material objects in the room around her. To account for what we see in mirrors, she posits additional things over and above the familiar objects around us. Casati calls this a 'multiplier' move: the account supposes that what is seen in the mirror is something other than the things actually placed before the mirror (2012: 195).

Alice thus tacitly advances the first strategy to resist the argument I presented earlier: argue that what we see in a mirror is in fact behind the mirror. She does not regard her experience of the room in the mirror as an illusion. She need not, given that she believes that the mirror gives her a view on a distinct room located behind it. She thinks that the mirror makes visible a collection of material objects located behind the looking glass.

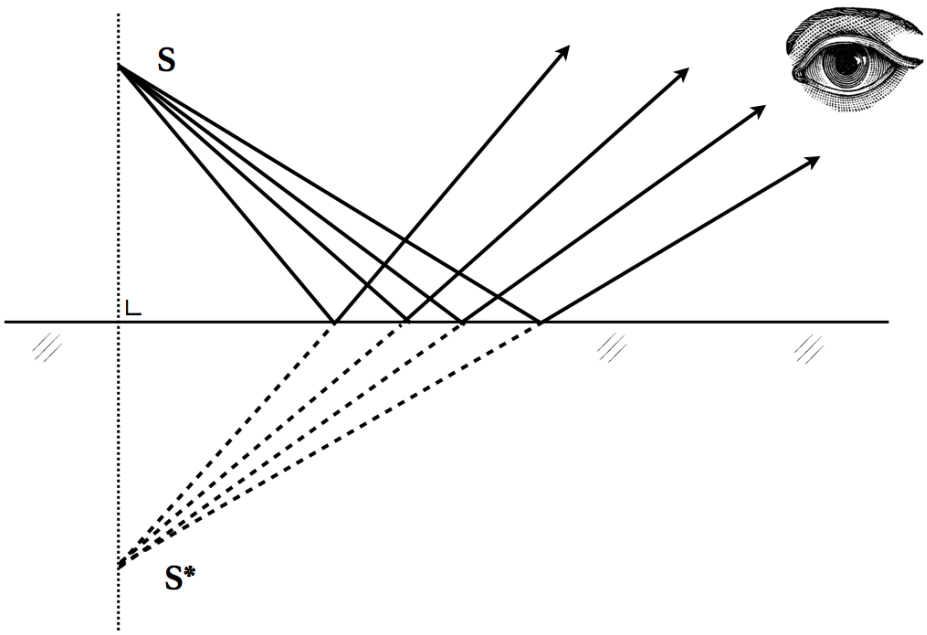



Figure 1: Typical optical diagram illustrating the classical law of reflection.

In the story, Alice seems able to support her hypothesis empirically. We read how she manages to step through the mirror and enter the other room, look into its fireplace, and browse through the collection of Jabberwocky poetry. However, readers will have realised that her excursion was no more than a dream, and that there is no sound evidence of her having been there. Alice gets something wrong about what she sees in the mirror. But someone under the spell of modern optics may think that this is not the location of what she sees. Apart from its fantastical details, Alice's catoptrics is in fact close to something elementary optics invites us to suppose.

Alice thinks that what she sees is located at some point behind the mirror. Modern optical theory is typically interpreted as agreeing with this judgement. Optical textbooks often state that what we see in the mirror must be construed as being behind it (fig. 1). This is generally

taken to convey an optical fact about the location of what is seen in a mirror. What we can see in a mirror is determined by how something before the mirror geometrically relates to the mirror itself.[8] These relations jointly determine the location of a visible mirror image.

The theory of visible mirror images is widespread, also in philosophy. For example, Ned Block, when investigating the properties of mirrors, takes it to be obvious that

> The principles of simple geometrical optics which determine that the mirror produces the image it produces depend only on the geometrical relation between the surface of the mirror and the reflected object. (Block 1974, 267)

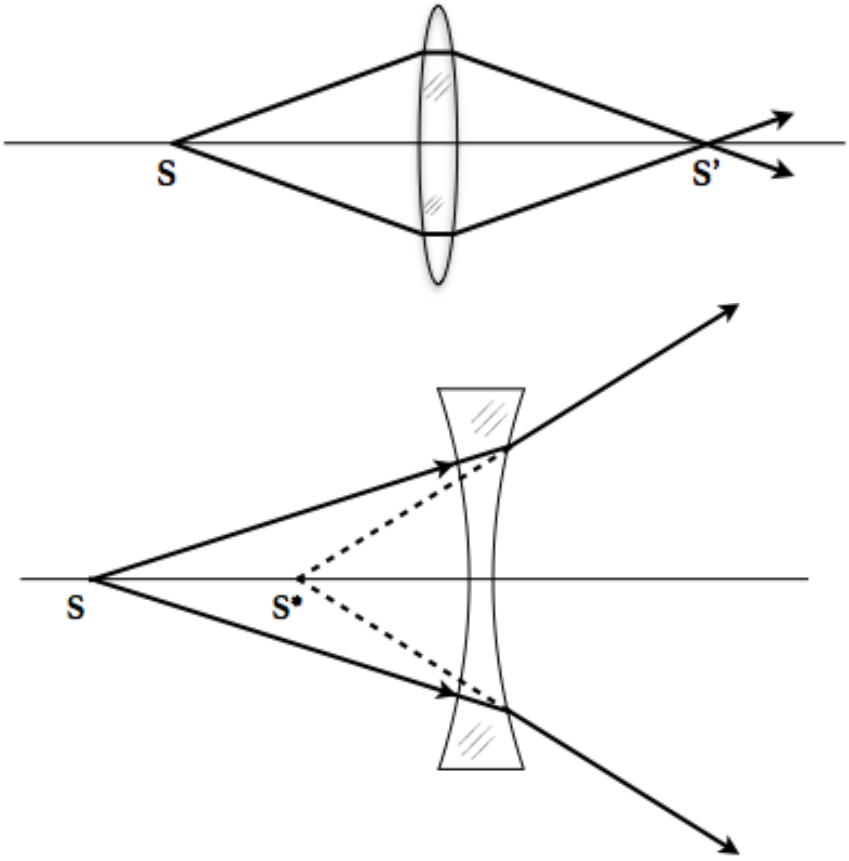
Block presupposes that reflection consists in the production of a purely optical image of a reflected object. He maintains we see such images whenever we look in a mirror, and assumes that "mirror images are located a distance behind the mirror equal to the distance from the mirror to the reflected object" (268). In this way, Block can rely on the assumption that what we see in a mirror is behind it without committing himself to Alice's fantastical duplicate world.

What Alice gets wrong, according to the opticist, is the nature of what she sees. Alice assumes that what appears to her to be behind the mirror's surface is a collection of material objects. Yet, as the opticist has it, all that is visible to her is a non-material, virtual image. As Mohan Matthen puts it, in a mirror we see a virtual object; it lacks physical properties and cannot exert a physical influence on things (Matthen, forthcoming).

Alice and the opticist disagree over whether what we see in a mirror is material or not. Yet both are able to resist the conclusion that mirror reflections are illusory, because both assume

[8] See Turbayne 1959 for a history of this principle.

that what we see in a mirror is in fact located behind it, be it actually or virtually. Yet they do so only by making controversial assumptions. Alice gets into obvious trouble because what she assumes is empirically false: there is no room with Jabberwocky books located behind the mirror. But the opticist's correction in terms of a non-material image is questionable as well. Understood as an interpretation of how optics connects to the theory of vision, it has neither a solid empirical basis, nor a rationale in introspective judgment. Let me explain this.




Figures 2 and 3: Two figures, the top showing real image formation (S') using a lens, the bottom showing virtual image construction after divergence through a lens (S*).

First of all, there is little empirical support for the existence of mirror images. Here it is important to distinguish real images from virtual images (fig. 2 and 3). Real images can be projected onto a surface, as we may observe in a *camera obscura*. They can moreover have physical effects: they may chemically alter photosensitive film or discolour surfaces when

projected for prolonged periods of time. In contrast, virtual images cannot exert a physical influence on things. They are not real images (in the optical sense). Our conception of virtual images is first and foremost based on a geometrical model of the behaviour of light when passing through lenses or reflecting in mirrors. That model sometimes asks us to construct a 'virtual intersection' of rays that do not actually intersect. Unless we have reason to import such an image—an aspect of the geometrical *model*—into our conception of reality, it is illegitimate to assume that there are any virtual images for us to see.

As a last resort it could be thought that, though not rooted in any empirical fact about mirrors, mirror images should nonetheless be postulated as a potential object of vision in order to explain how they impact on the phenomenology of visual perception. But this is also not promising. Once we take introspective evidence seriously, we see that it conflicts with the opticist's hypothesis.

When you look into your bathroom mirror, what you see in the mirror looks exactly like a human face. Mirrors typically show things that look just like some ordinary scene or object, something you could encounter face to face. That is what vision tells us, so to speak. According to the opticist, however, what we in fact see is no more than an immaterial image. This is a conflict; visual experience tells us that we are looking at a physical object, yet the opticist has to urge that this is misleading. In this way the opticist invalidates the only grounds that could support their position.

The opticist's way of connecting geometrical optics to the theory of vision may strike one as wrong-headed. We need not make the initial assumption that what we see in a mirror is an image. As an assumption about what we see this lacks empirical support and seems to contradict our first-personal judgments.

A more neutral stance is available, however. This is a stance that allows one to engage more directly with the specular illusionist 's claim about the phenomenology of looking at things in mirrors. In what follows I will assume this more minimalist understanding of the situation. In your bathroom mirror you look at your own face—an actual material object—*via* the mirror.[9] There is no image here, just the mirror and your face. Yet I also want to say that seeing your face over there is no illusion. Given the argument under consideration, this forces me to deny premise 3, that what we see in a mirror appears to be behind it—the second strategy I announced above.

### 4. Appearing in situ

I have already brought out that specular illusionism must involve a first-personal claim about how things appear when they are seen in a mirror: the scene we see appears to be behind the mirror. As yet we have no reason to reject this idea off-hand. It could be correct. But why accept it? To answer this I want to consider more carefully the nature of such visual appearances.

Here is a commonplace starting point. When you see your face in your bathroom mirror, you see it *over there*. Your eyes must face some part of the mirror. You can point to where you see your face, and trace its outline on the mirror's surface. That you see your face *over there* is self-evident. But it is not obvious that the only way to construe this is in terms of the apparent location of what you see. I want to suggest that it is more precise to construe it in terms of the ordinary concept of a *direction*.

[9] A similarly minimalist account is suggested by Boyd Millar. He thinks that an account that construes mirror perception in terms of the perception of virtual objects is unnecessarily complicated. Such an account, he writes, “ought to be rejected for that reason: a far simpler account is that when you see something reflected in a mirror what you see is an ordinary physical object" (2011, 568n19).

Let me clarify the notion of direction in vision. As many philosophers have noted, the phenomenology of vision is structured in a field-like way. The things we see appear to us at some point or in some region of our visual field. Things can compete to occupy such regions; one thing that occludes another renders that other thing invisible from our point of view. What portion of the visual field is occupied by an object depends in part on where that object is located, but also on where we are, relative to that object. We can specify which portion of the visual field is occupied by an object we see by specifying a direction relative to us, for example by saying "I see the apple *over there*" or by pointing in the direction in which we have to look in order to see the apple.[10]

Often, in specifying which portion of the visual field is occupied by an object we will indicate the location of that object in the world. But we need not. To explain this, we must see that the direction in which something can be seen does not necessarily determine the location the object appears to be in.

The two notions are conceptually distinct. When I walk past an object, the direction in which I can see the object changes as I move. Standing in the doorway, my desk is visible to me when I look straight ahead; when standing next to the bookcase, it is visible to my right. The direction in which I have to look to see the writing table has changed; still, the apparent location of the object remains the same. That is, the table does not appear to have moved.

In ordinary vision, the direction in which we can see an object and our perception of its location are regularly tied up. More strongly, often we can see an object in a certain location because we see it in a certain direction. When I see my table, looking straight ahead enables me

[10] I am talking here about perception, where what we become aware of is experienced as 'out there' in the world. The notion can also be used derivatively, for instance to indicate what part of our visual field is occupied by an after-image or phospheme.

to perceive the table located at some point in the space in front of me. This much is obvious. But what to make of it?

Anyone who restricts their diet of examples to straightforward scenarios like staring at one's tabletop might be tempted to think that seeing an object when looking in a certain direction just is seeing it as lying somewhere in that direction. It is this assumption that drives people like Vendler and Clark to advance specular illusionism as entirely obvious. For if seeing an object in a certain direction just is seeing it as located at some point in that direction, then from the fact that what you see in the mirror appears in the direction of the mirror, we must conclude that it appears to be located at some point in that direction. This would indeed give us reason to think that what we see in a mirror appears to be behind the mirror.

However, as soon as we acknowledge that mirrors make a specific contribution to our visual world, any such inference becomes controversial. It is natural to think that they do make such a contribution, on the basis of both their physical properties and the way they impact on the phenomenology of vision. Specular surfaces enable us to see things by looking in directions other than those in which those things lie. This is both a physical and, I suggest, a phenomenological fact.

The optical properties of mirrors make objects visible in directions that do not correspond with the actual location of those objects. Let me discuss two cases in order to demonstrate that to see an object when looking in a certain direction does not necessitate seeing it as located at some point in that direction.

> **CASE 1:** In 1975 Dan Graham staged a performance work titled *Performer/Audience/Mirror*. The artist lectured with his back toward an audience, while facing a

large mirror. People seated in the audience were able to see Graham both from the back, partly occluding the mirror, and via the mirror, as his front was reflected in it.

When something is placed before a mirror it may be visible twice. This is familiar. But notice that in such a situation the object is visible by looking in two different directions. Depending on audience seating, Graham would have been visible both, say, to an audience member's right from the back, while his face would have been visible in another, slightly different direction. If seeing an object in a certain direction just amounts to seeing it located at some place in that direction, then, given that the audience could see a person by looking in two directions, it must have seemed to them that there were two people located before them. If objects of vision appear to be located in different locations, then they appear to be distinct objects.[11] Yet clearly in such a situation there need not appear to be distinct 'Grahams'.[12] Rather, the same person was visible to the audience in two distinct directions, and located at a point along only one of these.

Here is a second case.

**CASE 2:** Shimamura is travelling on a night train. The landscape outside is cloaked in darkness. Someone sits in his train car. It's wrong to look at the person directly, Shimamura thinks, but he covertly scrutinises their face using the reflection in the

[11] A point notoriously emphasised by Kant, *KrV* A264/B320.

[12] Further support for this can be found in a study by Jonas and Bertamini (2007). When people simultaneously see an object both head-on and reflected in a mirror, the mirror perception improves the person's estimation of the size and distance of the relevant object. As Millar explains, if we were always fooled by reflections in mirrors, "then in such situations a subject would perceive two objects, and the properties of the one would not provide any information about the size and distance of the other" (2011, 567).

carriage window. All the while, he pretends to merely gaze at the moonlit fields outside, which are equally visible to him through the window.[13]

This situation is also familiar. Given their specular properties, windows can be mirrors, be it imperfect ones. This becomes clear when they look out on relative darkness. Because windows are also transparent, we encounter a situation that cannot arise with an ordinary mirror: we can see both something reflected in the window, and something visible to us through that window. If seeing an object when looking in a certain direction just is seeing it as lying somewhere in that direction, then it must have seemed to Shimamura that the person's face and the evening landscape were both in the same location, because they were visible in the same direction. The fellow traveller would have appeared to be hovering outside in the landscape. Yet this is not how things typically appear. Kawabata's characterisation in terms of a superimposition should ring true to anyone familiar with this kind of situation. What we see reflected in a window does not always appear to be located on its other side. Something can be seen in a specific direction without appearing to lie somewhere in that direction.

What do these two examples tell us? They make it clear that an object's apparent location is both distinct and distinguishable from the direction in which we see it. While what we see in a mirror is only visible to us when we look in the direction of the mirror, it need not appear to be located at some point in that direction. This opens up a more accurate way of capturing how faces appear in bathroom mirrors.

## 5. Seeing mirrors

When you see your face in your bathroom mirror, it appears *over there*. As I have shown, this may just mean that you see your face when looking in the direction of the mirror. That is the

[13] This case is taken from Yasunari Kawabata's novel *Snow Country* (1956) (雪国 *Yukiguni*, (1948)).

direction in which your face is visible to you. This fact captures what is self-evident about where we see our face. Moreover, it explains why it is so natural to arrive at the conclusion that when we look in a mirror, it at least seems as though we see some objects where they are not. Anyone concerned with capturing how things appear can stop here.

The specular illusionist moves beyond this observation. They hold that (i) mirrors make things visible in directions other than those in which those things lie, (ii) but they also make those things appear to be located somewhere in the direction in which the mirror makes them visible. To do so, the specular illusionist must rely on a further premise. Only some general assumption about how mirrors impact on the phenomenology of vision would justify a move beyond what is self-evident when you see your face in the mirror. But can any such assumption be compelling?

Some authors have tried to motivate an assumption like this by suggesting that only a general understanding of how mirrors contribute to the phenomenology of vision can explain the possibility of those situations where mirrors undoubtedly fool us. Clare Mac Cumhaill, for example, holds that the possibility of epistemically innocent cases in which you remain unaware of the fact that you are looking in a mirror can only be explained by some general fact about how mirrors make things appear.[14] I want to explain why we need not feel pressured to accept this.

Sometimes what we see in a mirror does appear to be located behind it. I mentioned how in magic shows mirrors may lead you to believe, wrongly, that things are located where there are not. A magician's stage-setting may be designed to render onlookers epistemically inno-

[14] Mizrahi (forthcoming) concurs, it seems, when she agrees that we must explain the possibility of erroneously perceiving an object as being located behind a mirror in terms of phenomenological similarities between mirror perception and perception of empty space.

cent. When this happens, you are simply not in a position to distinguish between your current experience of, say, looking at a hovering David Copperfield via one of his mirrors on stage, and that of looking at Copperfield hovering on stage, seen head-on. You would not be able to tell that you are looking at him via a mirror. Does the possibility of this kind of optical trickery reveal something about the impact mirrors as such make on the phenomenology of vision? Mac Cumhaill maintains that

> if one can mis-take the specular case for the non-mediated perceptual case, as one does in cases of innocence, then how space looks "in" mirrors is indistinguishable from how it looks in non-mediated perceptual experience. (2011, p. 488)

Mac Cumhaill thinks that how, say, an office appears when seen in a mirror must be indistinguishable from how it appears when seen head-on, because only this can explain the possibility of being fooled in epistemically innocent cases. She takes the fact that mirrors can mislead us to reveal something about how mirrors as such contribute to the phenomenology of vision. If she is right, then epistemically innocent cases should be taken into account when one offers a considered view of where things appear to be located when we see them via a mirror, opening us up to the specular illusionist's description of how things appear. On this picture, we should be compelled to accept that the impact mirrors by and of themselves make on the phenomenology of vision is necessarily indistinguishable from the impact of say, a transparent window or a hole in the wall, despite the fact that this is not always obvious to one.

Mirrors, on this line of thought, would make no recognisable contribution to visual phenomenology, but pass themselves off as something else that does make such a contribution, in particular as an empty space or transparent medium. If correct, this would vindicate the

specular illusionist's characterisation of how things appear in mirrors. It would force us to accept that what we see in a mirror appears to be behind it, even if things do not overall seem so when we stand in front of our bathroom mirror.

But the reasoning here is fallacious. Quite generally, one cannot validly argue from an observed failure to distinguish two things to the conclusion that these things are indistinguishable. I can mistake a parsnip for a carrot. That does not mean that parsnips and carrots are indistinguishable. It just means that I am poor at identifying root vegetables, which tells you more about me than about parsnips and carrots. Similarly, mirrors can fool us. But that at best shows that under certain conditions it may be hard or even impossible to appreciate their contribution to visual phenomenology; it does not follow that this contribution necessarily remains obscure in all circumstances. At best, the possibility of mirror trickery shows that mirror perception is *potentially* indistinguishable from seeing things head-on. This conclusion is perfectly compatible with a mirror's contribution being obvious in the vast majority of cases.

Mirrors do make a recognisable contribution to visual phenomenology. When you stand in front of your bathroom mirror, you can clearly see that you are looking in a mirror. In part this is because you see the mirror itself. It occludes a portion of the wall. You see its silvery surface and its edges. Of course, often mirrors are colourless and might not ever stand out for their own visual appearance. But it is a mistake to think that in order for something to be visible, it needs to possess a distinct visual appearance on a par with the visual quality of a tomato or a human face. True, the look of the human face enables us to reliably distinguish situations in which we see a face from situations in which we see something else. But to account for their visibility it already suffices to point out that mirrors can and do have some impact on how the scenes and objects we see in mirrors visually appear to us.

To illustrate this, consider the following. How a green necktie visually appears cannot exclusively be captured in terms of its visible qualities, but is equally determined by the conditions of illumination, as Wilfred Sellars famously brought out (Sellars 1997, 37). Those familiar with the colour of their favourite necktie may perceive those illumination conditions themselves when they consider which tie to put on. To acknowledge this, we are not forced to suppose that conditions of illumination themselves have a distinctive appearance in the same way that the necktie does. Their visibility is indirect, depending on how something else is visible. It may well be that you can only perceive a fitting room's illumination conditions because of how, given this illumination, your necktie appears. But that does not mean conditions of illumination cannot be seen.

Mirrors are visible as such, apart from any frames enclosing them. As with Sellars' illumination conditions, to be visible, mirrors need not themselves have a distinctive look. Their visibility may be indirect. The discernible silvery quality of mirrors may simply be attributable to how the qualities of objects seen in the mirror are visible to you.[15] People can reliably tell when they are looking at a mirror. As such, we must not reduce the way mirrors figure in our experience to how empty space or transparent surfaces figure in experience. We have no reason to deny that mirrors make a distinctive contribution to visual phenomenology.

In typical engagements with mirrors, the mirror is itself seen, and it is not treated as a hole or transparent medium. Moreover, ordinarily we are able to visually distinguish mirror perception from perceptual situations in which the object seen is located somewhere in the direction in which we see it. This matters. It suggests that even visually the experience of seeing some-

[15] Consider also the visibility of soap bubbles. While a bubble itself lacks colour, due to how the multi-layered surface reflects and transmits specific frequencies of light, the thin outer layer of a soap bubble creates an optical interference that makes the bubble appear coloured (such 'colours' are called 'Newton's colours'). The bubble is visible, but there is no way that it looks in and of itself.

thing in a mirror is not exactly like the experience of seeing something head-on. The specular illusionist, by contrast, must assume that what appears in a mirror, in virtue of being a reflection, must appear visually exactly like any other scene. They assume that how things appear in mirrors must be equated with how things appear head-on, as seen through a window or an opening in the wall. I have argued there is no reason to accept such assumptions.

## 6. Conclusion

Imagine yourself back in your bathroom. You can see your face in the direction of the mirror, but you also know that your face is not in fact located over there. Had you not been familiar with the kind of contribution mirrors make to the world of vision, this might have seemed baffling: seeing something in a direction in which it manifestly is not located. An illusion! While we may still appreciate this kind of confusion, I have shown that it need not involve a misleading dimension to the way things appear. The confusion arises purely because of a lack in knowledge of how mirrors contribute to the visual world.

The specular illusionist tries to move beyond this. She maintains that, regardless of our awareness of the fact that we see something reflected in a mirror, it will invariably appear visually as though the object we see is located behind the surface of the mirror. In this sense, she claims, mirror appearances are illusory. I have shown that there is no reason to think this. Construed as a claim about an object's location, the claim goes well beyond what is self-evident, and remains without a sufficient basis. The claim only has a ground when construed as concerning the direction in which we see an object. But such a visual experience does not amount to an illusion. Rather, it precisely brings out that mirrors contribute to the visual world by enabling us to see things in directions in which these things are not located. Our everyday experience with mirrors reflects a basic optical truth.

Philosophical catoptrics, the philosophical study of the optical properties of mirrors, demands further work if we are to understand the diverse ways in which objects can become visible to us. It reveals real, precise distinctions between phenomena that in ordinary vision may seem to be the same. Such revelations enable us to recast familiar issues in the philosophy of perception.

Philosophers tend to be unreasonably sceptical of appearances. Frequently, however, systematic investigation shows that not the appearances, but our theories about them are the cause of error.[16]

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