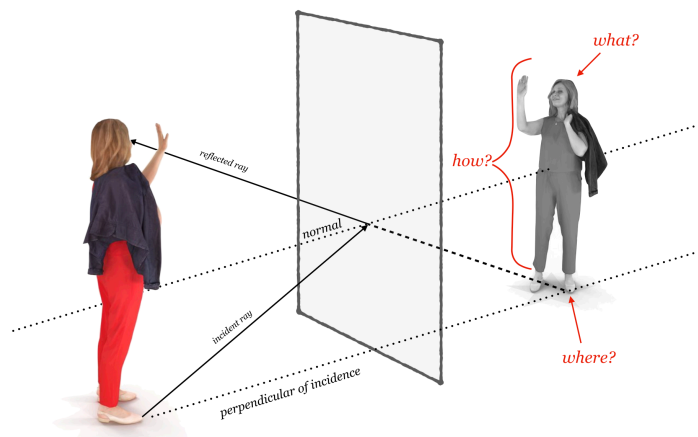


PHILOSOPHY IN THE MIRROR

1. Do we know what mirrors do? We do in at least two ways: (1) We understand their geometrical optics because we know what the law of reflection is: the angle of incidence of a ray of light reflected by the mirror is the angle of the reflected ray relative to a normal perpendicular to the surface, where the incident, normal, and reflected directions are coplanar. In addition, we know what Euclid said about *where* what we see in the mirror is placed: the object should be seen at the intersection of the (virtually extended) reflected ray with the perpendicular of incidence. (2) We also understand plane mirrors practically; we have no problem using mirrors (unless they are not clearly visible to us).



2. Philosophy of mirrors. But this does not imply that at a *conceptual* level we fully understand what mirrors do. People think about mirrors in confused and contradictory ways. This gives rise to philosophical puzzles. The following three are the most famous. (A) There's a confusion about *what* we see in a mirror: a puzzle about mirror images. (B) There's a confusion about *how* what we see in a mirror looks: a puzzle about what is distinctive of mirror appearances. (C) There's a confusion about *where* what we see in a mirror appears to be: a puzzle about the perceived location of things we see in mirrors.

3. Mirror Images. What do you see in your bathroom mirror? Common sense is unclear: we speak of "seeing our reflection" just as readily as we speak of "seeing our face" in a mirror. Also the optical theories seem confused. We are told to construct an image behind the mirror surface; so there are mirror images? Yet at the same time we shouldn't think of this as a *real* image; so there aren't any? I think we should take appearances at face value. What you see in the mirror doesn't look much like an image of you. Imagine projecting an image of your face using lenses. Now compare that image with what you see in your bathroom mirror. Clearly, what you see in the mirror looks more like a human face than it looks like an image of a human face. So taken at face value, we see a human face. Does this contradict optical theory? Not if geometrical optics offers us just a *model* of the visual world (instead of a literal description). A mirror diagram tells you from where ordinary objects are visible (or projectable). You can learn from them that you can see your own face in the mirror if you look in the direction of where the model places a virtual image.

4. Left/Right reversal. I don't want to say there isn't anything peculiar about mirror appearances. For example, why do mirrors reverse left/right but not up/down? The law of reflection doesn't privilege any of the axes parallel to the mirror's surface. Philosopher Ned Block suggests an answer: the relation between what you see in the mirror and your own face is like the relation between your left and right hand—they are enantiomorphs. Enantiomorphs are weird, but they don't privilege any axis as the weird one. True, I might be unable to fit my left hand in the space of my right hand because my left thumb is on the wrong side. But this is just a feature of rotating my right hand along the vertical axis. If I rotated it along the horizontal axis, I'd find that my thumbs are on the same side but the tip of my fingers touches my wrist. Because we're so used to thinking of rotation as being along the vertical axis, mirrors appear to reverse left/right. But they merely appear to do this, because reversal can disappear by imagining a different rotation. Note, this explanation assumes that we see mirror images. What if we don't? Back to square one?

(A) **WHY DO MIRRORS REVERSE RIGHT/LEFT
BUT NOT UP/DOWN?**

(B) **WHY DO MIRRORS REVERSE RIGHT/LEFT
BUT NOT UP/DOWN?**

5. Location of what we see. A third puzzle is independent from apparent left/right reversal. It has to do, not with the way the object in the mirror looks, but with where it appears to be. Many people like to think that the object we see appears to be somewhere over *there*, behind the mirror. If we see mirror images, then we would get this right. If you just see your own face, then the experience would be an illusion of location. Either way, something weird is going on. A mirror is typically opaque. Opaque objects hide things behind it from sight. Moreover, mirrors typically also *appear* to be opaque. The puzzle is: how can something appear to be behind something that appears to be an opaque object? There are two possible responses: (1) The mirror doesn't really appear opaque. Instead, mirrors appear, Lewis Carroll-style, to be windows on a special kind of mirror space. If that were the case, then our experience would be a much more magical illusion. (2) A better response, I think, is to deny that the object appears to be behind the mirror. Think again of what optics tells us: what you see in the mirror is visible when you look in a specific *direction*. The object you see appears to be visible in that direction. That's right. But that does not yet mean it also appears to be located somewhere in that direction. It doesn't, typically. Direction and location can come apart. This allows us to say that, at least typically, what you see in the mirror does not appear to be behind it.

6. Conclusion. What do we gain from having a better conceptual understanding of what mirrors do? In part it will shed light on the uses of optical theory in theorising about visual perception, and on the fine-grained distinctions used to describe visual experience. That seems a useful result for psychology and vision science. But it also will be able to have a welcome disenchanting effect, by diminishing the mysteries people tend to associate with mirrors.