Do Things Look Flat?

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Abstract

Does a penny viewed at an angle in some sense look elliptical, as though projected on a two-dimensional surface? Many philosophers have said such things, from Malebranche (1674/1997) and Hume (1739/1978), through early 20th-century sense-data theorists, to Tye (2000) and Noë (2004). I confess that it doesn't seem this way to me, though I'm somewhat baffled by the phenomenology and pessimistic about our ability to resolve the dispute. I raise geometrical complaints against the view and conjecture that views of this sort draw some of their appeal from over-analogizing visual experience to painting or photography. Theorists writing in contexts where vision is typically analogized to less-projective media – wax signet impressions in ancient Greece, stereoscopy in introspective psychology circa 1900 – are substantially less likely to attribute such projective distortions to visual appearances.

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Plus one figure

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i.

I've put a penny on my desk, and I'm viewing it at an angle. Does it look circular? Or, instead, do I only know or judge that the penny is circular, while the figure it presents to my sight – its actual visual appearance – is an ellipse? I gaze out my window and see a row of streetlights. Does it look like they shrink as they recede into the distance? Or do they all look the same size? Get out a penny, open the blinds, try it yourself. (I'll wait.) What do you think?

A long line of philosophers, stretching at least from Malebranche (1674/1997) through Ayer (1940) and Austin (1962) to Tye (2000), Noë (2004), and Kelly (forthcoming) has said the following: There's a sense in which the obliquely-viewed penny looks elliptical and the distant streetlights look smaller and a sense in which they don't. Tye says that the coin looks like an object that really is round and also that the coin looks "elliptical from here". Noë, developing a similar view, asserts that it's just what it is for a coin to look circular that it presents varying elliptical appearances depending on the angle from which it's seen; and he stresses that our visual experience always has, simultaneously, two "aspects" – a perspectival aspect (in this case the elliptical appearance) and an aspect reflecting our experiences of the constancy of the objects we see (in this case our experience of the penny being genuinely round). Kelly offers an interesting criticism of Noë's view: According to Kelly, we don't experience the circularity and ellipticality simultaneously but rather flip between the two ways of

experiencing the coin, much as we flip between different ways of seeing an ambiguous figure; but despite this disagreement, Kelly grants, with the others, both that the penny looks circular and that it has an elliptical "apparent shape" that we sometimes experience.

Now, is something like this have-it-both-ways view right? And if so, how exactly does it play out in experience? Or is some purer just-the-circle or just-the-ellipse view right? What, exactly, do I visually experience as I look at the penny? That seems like a substantive, interesting question – a question, furthermore, of the sort many philosophers have thought we have excellent, perhaps infallible epistemic resources to answer – a question, that is, about the intrinsic properties of one's own ongoing conscious experience. Am I alone in finding such questions baffling?

For what it's worth, as I stare at the penny now, I'm inclined to say it looks just plain circular, in a three-dimensional space – not elliptical at all, in any sense or by any effort I can muster. I can't manage any Gestalt switch; I discern no elliptical "apparent shape".

ii.

Now I don't wish to be dogmatic about that last point. I feel uncertain in my own introspections. The streetlights in the distance do, maybe, look smaller, in a way. When I tilt the coin far enough, I start to feel the pull of the idea that it presents an elliptical appearance. Can I say these things consistently with denying the coin's elliptical appearance at a 45˚ angle? Rotating the coin back from 80˚ to 45˚, does the impulse to say it appears in some sense elliptical at some point evaporate?

I confess I'm perplexed. Perhaps my phenomenology is disorganized, or not organized in a geometrically simple way? Or perhaps my terms and concepts are muddled? What is it for something to "look elliptical"? Is the dispute, perhaps, entirely linguistic, or purely theoretical, while the phenomenology itself, considered on its own, is absolutely obvious?

Or am I simply a poor introspector? Maybe the fact that my own phenomenology in this case doesn't seem obvious to me reveals introspective ineptitude on my part. I mean that remark not at all ironically or disingenuously. And yet I'm not sure I should trust other philosophers' introspections either – even where they agree, even despite the broad consensus in contemporary philosophy about the elliptical "apparent shape" of the coin. Nor am I hopeful (as Kelly is, for example) that psychological experimentation will yield cleanly interpretable results in matters of this sort.

I wish I could find my way through this morass. I can't. So I aim to drag you down into it with me.

iii.

There are several ways to transform a circle into an ellipse, but the most natural in this context seems to be to project it obliquely onto a two-dimensional plane – presumably a plane perpendicular to the line of sight. Let's suppose that's how the geometrical transformation is supposed to proceed in the case of the coin: The coin "looks elliptical" or has an "elliptical apparent shape" because projecting it along the line of sight onto a plane perpendicular to that line produces an elliptical figure. Plausible enough?

It's tempting, then, to generalize: The apparent shape of any normal object is determined by its two-dimensional projection onto a plane perpendicular to the line of sight. This seems the most straightforward development of the view; and none of the authors so far discussed, to my recollection, explicitly wards against this interpretation.[1] But problems loom.

First, it would seem to follow that my hat, viewed from the top, also appears elliptical, that the orange in front of me appears circular, that the obliquely viewed book on my desk appears (roughly) hexagonal – and, in short, that everything looks or appears (in the relevant sense of "looks" or "appears") two-dimensional, flat. Do we really want to be committed to this? The peculiarity of this view can be missed when the object in question, like a penny, is already something approximately flat.

I don't know whether most of the philosophers who claim that the coin, in some sense, presents an elliptical "apparent shape" would accept the view that everything (in that same sense) looks flat; I suspect not. Yet it isn't evident exactly where to put on the brakes. Can something's apparent shape be defined by its two-dimensional projection

[1] Price (1932) is an interesting exception to this tendency. He claims that the degree of perspectival distortion varies with distance – that we experience nearby objects in their true shapes and sizes, while more distant objects become progressively flatter and more distorted. An obliquely viewed penny at arm's length might, then, look circular while a coliseum viewed at the same angle from an airplane looks elliptical. At least, that seems to be the suggestion on p. 218-221. (Elsewhere (e.g., p. 207), however, Price seems to accept that the obliquely viewed penny does look elliptical. I'm afraid I don't see how all his comments on this matter can be rendered fully consistent.)

without its presenting any sort of flat appearance? Well maybe; but that seems a rather uncomfortable sort of view.

Planar projection also invites the question of how to account for the streetlights smalling off into the distance. We can render the farther ones smaller on the plane by projecting along lines that converge at the eye – no problem there; that seems natural enough. But a peculiar result follows from the fact that lines coming from the side will intersect the plane obliquely: the planar projections of objects off the central line of sight will be considerably larger than their straight-ahead counterparts – weirdly larger, if projective size is supposed to be isomorphic to apparent size (see fig. 1).

Insert fig. 1 about here

A natural way to avoid this result would be to project objects not onto a <u>plane</u> but rather onto a sphere centered at the eye. (This would also capture the idea that apparent size varies with visual angle subtended.) But now we've lost our ellipse. The projection of a circular region onto a spherical surface isn't elliptical: The ellipse is a planar figure. The resulting projection is a <u>concave</u> ellipse-like figure (or convex, if the projection passes through the interior of the sphere). Is this, then, the coin's <u>real</u> apparent shape, to speak most accurately? Does the world look concave? I can almost (but only almost) warm up to the idea – it seems, actually, better to me than saying the world looks flat.

iv.

Is it just obvious and undeniable that the coin appears or looks (in some sense) elliptical, in a way that no geometrical cavils can touch? It's not obvious to me. But of course that's just confessional, just me, and maybe I'm being obtuse or willfully blind. Quite possibly so!

However, I'll tell you what I suspect. I suspect that our inclination to regard the apparent shape of the coin as an ellipse and the farther lightposts as smaller – our inclination to attribute to visual appearances or visual experience what I'll henceforth call projective distortions – is due to over-analogizing visual experience to flat media such as paintings or snapshots. Noë himself interestingly suggests that theorists have often over-analogized visual experience to snapshots, mistakenly attributing to visual experience photographically rich detail from the center far into the periphery. What I'm suggesting is that the mainstream community in philosophy of perception, including Noë, over-analogizes to pictures in a different way, taking visual experience or "apparent shape" to be, in some sense, flat like a picture: The coin "looks" elliptical because that's how we'd paint it.

We over-analogize the mind quite often, I suspect, casting what's difficult and recondite in terms of better-known outward media and technologies, then misattributing features of those technologies back into the mind. If you're a Searle fan or a connectionist, you might think we did that in the 1970s and 1980s, analogizing thought to classical computation. (Earlier philosophers analogized thought to clockwork or hydraulics.) My favorite example of over-analogizing, though, is the over-analogizing of dreams to movies. This went so far that in the 1950s the overwhelming majority of North Americans said they dreamed in black and white! (Now we say we dream in color. I'm

not sure that's true either. See Schwitzgebel 2002; Schwitzgebel, Huang, and Zhou forthcoming.)

v.

I'm not sure how to establish what I've just suggested. Maybe it can't be established. But here's a conjecture which, if true, may support the idea: Theorists writing in contexts where vision isn't typically analogized to two-dimensional, projective media will be substantially less likely to attribute projective distortions to visual experience than those analogizing vision to painting or photography. Two historical periods are especially relevant to this hypothesis: ancient Greece, where the dominant analogy for visual perception was impressing a signet upon wax, and introspective psychology circa 1900, where the dominant analogy (for binocular vision) was the stereoscope.

If a signet is correctly applied, the impression in the wax will accurately match, in complement, the entire shape of the signet, with a correspondence part-for-part that doesn't vary with the circumstances of application. Unlike photographs or paintings, wax impressions don't reflect different parts of their subject, or take on a different arrangement of shapes, with variations in perspective (though, of course, we may see a wax impression from different perspectives, or a signet may be engraved, incidentally, with a perspectivally represented scene). Now perhaps this absence of perspective is a weakness in the wax-signet analogy: Clearly, in some sense, perception – vision especially – is perspectival. Furthermore, vision is perspectival in a way resembling painting and photography in at least the following respect: A picture will portray (and

omit) almost exactly the same parts of its subject a viewer would see (and not see) from that side. In this respect, at least, the picture analogy is superior to the wax-signet analogy for vision. But of course it doesn't follow from this alone that the apparent shapes of things involve projective distortions.

Aristotle and Plato famously employ the signet analogy for perception and memory in De Anima (424a; 435a; see also De Memoria 450a where Aristotle employs both the signet and the picture analogy) and the Theaetetus (esp. 191c-194d), respectively. And indeed in these works, and in related works I've reviewed, neither ever attributes projective distortions to visual appearances, though they do discuss various puzzles about perception, and Plato provides other examples of variation in sensory appearance and judgment. Epicurus embraces the signet analogy (see Letter to Herodotus 49 [note the word εναποσφραγίσαιτο] and Plutarch's Brutus) and positively asserts that our impressions are the same shape as the objects perceived – that is, apparently, not projective distortions.

Sextus Empiricus, though critical of the signet analogy in some places (e.g., Against the Logicians I.228, 250-251, 372, II.400; Outlines of Skepticism II.70), appears to employ it uncritically in others (AL I.293; OS I.49) and never to my knowledge analogizes perception to having a picture in the mind. He's a particularly interesting case because he repeatedly emphasizes variation and distortion in sensory appearances, offering extensive catalogues at, e.g., OS I.44-52, 100-127; AL I.192-209, 414. For example, he notes that things look different after one has stared at the sun, or when one presses the side of one's eye; that mirrors can change the appearance of things; that oars look bent in water, straight in the air; that what appears in motion or at rest depends on

whether one is on the ship or the shore; and so on. Sextus's skeptical arguments require that he stress how sensory appearances vary with differences in situation; it's one of his most famous and central points. And yet I find no mention of the kinds of cases that dominate later discussions of projective distortion, such as the coin viewed obliquely or the receding row of columns – or, indeed, any unambiguous mention of two-dimensional projective distortions of any type whatsoever.[2] It's difficult to imagine that he would have left phenomena of this sort off his lists of perspectival variation, had they occurred to him.

I'm no classical scholar, but in the ancient Greek literature I've managed to review thus far, I've found few explicit comparisons of visual perception, or even visual imagery, to pictures or paintings. And I've found no clear case of any ancient Greek philosopher attributing projective distortions to visual appearances. One does begin to see projective distortion, however, and perhaps a decline of the wax analogy, with even as small a

[2] Sextus does say that from a distance a square tower may look round or a large thing small (OS I.118; AL I.208, 414), but I read these as cases of genuine misperception rather than projective distortion. He also mentions that a column viewed from one end appears to taper but not when viewed from the middle (OS I.118). I'm inclined to read this as pertaining to illusion in the perception of columns, a topic much discussed in ancient Greece, and not as involving projective distortion in the sense discussed here. A genuine projectivist would probably say that columns appear to taper at both ends when viewed from the middle.

cultural shift as to ancient Rome (Lucretius De Rerum Natura IV, circa l. 430) and Egypt (Euclid's and Ptolemy's optics; Plotinus Ennead II.8, IV.6.1).[3]

(Translations of ancient Greek classics do often employ the word "picture" in discussions of visual imagery – that is, not visual sensations, but visual imaginings. As far as I can tell, however, from the cases I've examined, it is generally the translator bringing in the analogy; the original Greek texts do not explicitly suggest it. Such interpretations may arise because calling images "pictures" almost doesn't seem metaphorical to us. We're even more prone to compare visual imagery to flat media than visual sensation. I wonder why this is. Are images actually flat? Or does their seeming insubstantiality discourage comparison to more robust media regardless of their two-dimensionality or lack of it?)

vi.

Stereoscopes, which enjoyed a vogue in late 19th century parlors, served as the preferred analogy for binocular vision among some of the early introspective psychologists (e.g., Helmholtz 1867/1925; Mach 1886/1959; Wundt 1897/1897; Titchener 1901-1905, 1910). A stereoscope holds two photographs, taken from slightly different perspectives, and

[3] The term "impression", which seems derived from the signet metaphor, continued, of course, to have a prominence in philosophy into the modern period – but I suspect that the metaphorical force, the power of the suggestion of impressed wax, declines in those later uses. Likewise for contemporary psychological use of "stereoscopic" in reference to binocular vision.

presents one to each eye. If the perceiver succeeds in "fusing" the two pictures, she experiences a lively three-dimensional effect. Although stereoscopes are perspectival as signet impressions are not, the stereoscopic image is not a simple two-dimensional projection.

In accord with my conjecture, I've generally found that psychologists favoring stereoscopy as an analogy for sight also tend to avoid saying (except in cases of outright illusion) that "apparent size" varies with distance or that the circle viewed obliquely "looks" elliptical – though Helmholtz is a notable exception. Conversely, authors not as swept up in stereoscopy (e.g., Dewey 1886), or who seem generally to prefer the picture analogy (e.g., James 1890/1981), more frequently attribute projective distortions to experience.

Psychologists analogizing vision to stereoscopy tend to stress the difference between monocular and binocular vision. Mach, for example, in presenting a sketch of what he takes to be a moment of his visual experience, emphasizes that a flat picture can only adequately represent monocular vision; "stereoscopic" vision, he says, can't be represented by a single plane drawing (1886/1959, p. 18-19).[4] Would he, then, have been willing to say that a circle viewed at an angle looks like an ellipse monocularly but not binocularly? To contemporary sensibilities this may seems strange: It seems – to me at least – that monocular vision just isn't that different from binocular vision (though see O'Shaughnessy 2003). Binocular disparity (as late 19th-century psychologists well knew) is only one among many depth cues. The world doesn't go flat and then puff out as I

[4] Noë reproduces this sketch (2004, p. 36), but doesn't mention this aspect of Mach's presentation.

open and close one eye, I think. But of course in stereoscopy, the difference between monocular and binocular views is essential.

Psychologists fond of the stereoscope analogy also seem readier than others to find doubling in visual experience, like the doubling, perhaps, of an unfused image in a stereoscope. Titchener writes, for example:

> [T]he field of vision … shows a good deal of doubling: the tip of the cigar in your mouth splits into two, the edge of the open door wavers into two, the ropes of the swing, the telegraph pole, the stem of another, nearer tree, all are doubled. So long, that is, as the eyes are at rest, only certain objects in the field are seen single; the rest are seen double (1910, p. 309).

That most people fail to notice this, Titchener remarks, is "one of the curiosities of binocular vision".[5]

vii.

Hume writes:

> 'Tis commonly allowed by philosophers, that all bodies, which discover themselves to the eye, appear as if painted on a plain surface (1739/1978, p. 56).

And G.E. Moore says, after holding up an envelope:

[5] Such remarks aren't limited to stereoscope enthusiasts, however: e.g., Reid 1764/1997 §VI.13.

> Those of you on that side of room will have seen a rhomboidal figure, while those in front of me will have seen a figure more nearly rectangular (1953, p. 33).

I suppose it isn't as obvious to me as it has been to many others that there is any sense in which these remarks are true. But I'm not sure how to go about resolving this question. Staring longer at the penny leaves me only more perplexed.[6]

[6] Thanks to David Barlia, Richard Betts, John Dilworth, Carrie Figdor, Brian Keeley, Pauline Price, Teed Rockwell, John Schwenkler, Charles Siewert, and Gideon Yaffe for useful discussion. Thanks to Glenn Vogel for designing the figure. For more general skeptical reflections in a similar vein see Schwitzgebel (in preparation).

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Figure 1