

## **Egocentric Perspective: Depicting the Body from Its Own Point of View**

Robert Pepperell (artist), Cardiff School of Art & Design, Cardiff CF5 2YB, U.K.

Email: [rpepperell@cardiffmet.ac.uk](mailto:rpepperell@cardiffmet.ac.uk).

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### **Abstract**

*We are almost always visible to ourselves. Depending on how you are seated, reclining or standing you will see parts of your nose, legs, hands, arms, shoulders or trunk from your own point of view. Yet these everyday features of our visual world are rarely depicted and hardly ever in a way that accords with our perceptual experience. In this paper the author considers why we tend to ignore this “egocentric perspective” and how it can be represented.*

Jean-Baptiste-Siméon Chardin is regarded as one of the greatest observational painters in western art. Yet when he made his self-portrait in pastel of 1771 he omitted his view of his nose and the frames of his thick-rimmed pince-nez, even though these would have been features of his visual field [1]. An expert reviewing an ultra-wide-angle fisheye lens warns his readers against inadvertently photographing their own hands and feet, and describes the contortions needed to avoid doing so [2]. Referring to a diagram in a textbook, its author says: “It illustrates the visual field and shows the roughly triangular region of binocular overlap within which both eyes receive input. The reason there is not more overlap is that the nose blocks the view” [3]. As these examples show, we prefer to exclude what we see of our bodies when representing the visual world.

Whether seen in direct vision or obliquely in the periphery, the egocentric perspective, which is distinguished from the view we have of ourselves in reflections or photographs, is the one constant feature of our visual experience. On those rare occasions when it is depicted in visual media the results, I will argue, lack fidelity to the perceptual structure of the experience. As an artist I have experimented with representing the egocentric perspective and have become aware through doing so of its widespread neglect and frequent misrepresentation. Some possible reasons for this will be discussed here, as will some examples of egocentric depictions in art and visual media. I will also outline my own attempts to capture visual experience more faithfully.

### **The Invisible Self**

Why do we habitually omit the view we have of our own bodies from representations of the visual world? According to the art historian LeRoy McDermott, it was not always so. Among the earliest forms of art are the so-called Venus figurines of the Upper Paleolithic period, made between around 10,000 and 30,000 years ago. For reasons that are still not clear, the figurines often lack feet or heads and have oddly proportioned anatomies. McDermott argues the characteristic features of these clay or stone figures can be explained if we recognize them as views of the body seen subjectively from the egocentric perspective — a proposal he calls the “autogenous hypothesis” [4]. He believes objects like the Venus of Willendorf represent what a pregnant woman would see looking down at her own body. McDermott supplies

photographs of figurines shot from the point of view of the absent heads that appear remarkably similar to those of modern women's pregnant bodies seen from their own perspective.

Most commentators have failed to accept this thesis, despite recognizing its originality and welcoming the accent it gives to women's self-determination in early human societies. But McDermott attributes some of this resistance to our presumption that such artifacts are to be viewed from a disembodied third-person perspective, and this betrays a powerful cultural bias — evident in science as much as anything else — that may not have applied when they were made. At some point in human development, he suggests, images based on the appearance of others supplanted those based on the embodied view of the self, resulting in the disappearance of the first person perspective from cultural life. If these figurines indeed represent what McDermott claims they would be the first of their kind in recorded history and almost the last. We find almost no explicit portrayals of the egocentric perspective until the late nineteenth century.

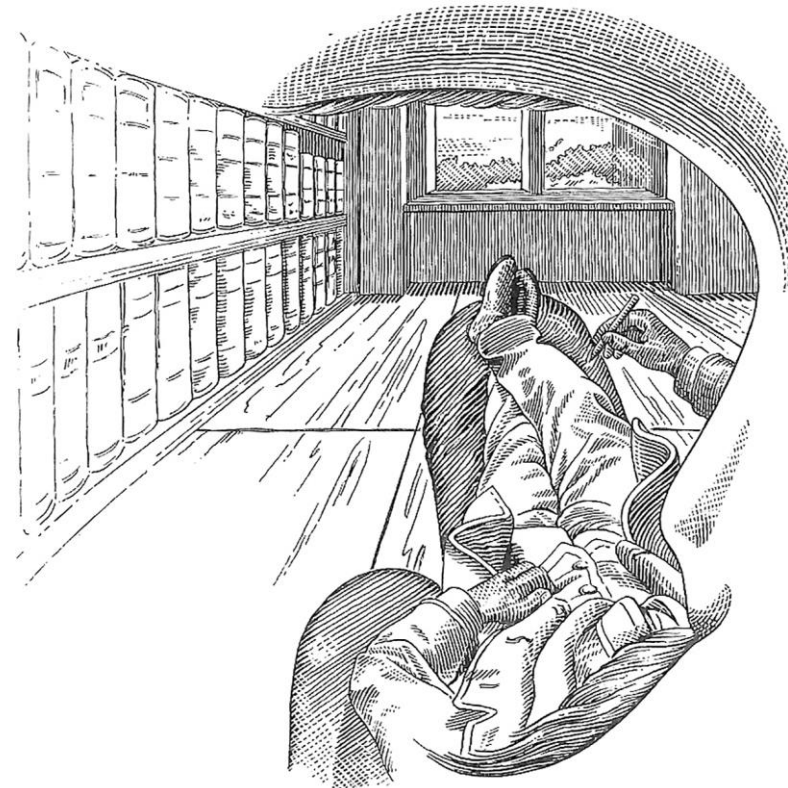
There are several possible reasons for our long standing neglect of the egocentric perspective: perhaps we become desensitized to the view of our own bodies through overfamiliarity, or perhaps it is the price of our ability to interact effectively with the world and with other people. Here we consider two possible causes for this neglect. First, it reflects a widespread and long held delusion that we are separate from the world around us; as a consequence, representing the world does not necessitate representing the self. Second, that we have habitually privileged what is focus over what is indistinct when representing what we see.

On the basis of the way space is organized in pre-Renaissance pictures it is sometimes claimed artists of that period did not suffer the delusion they were separate from the world [5]. But even if this were true, we find no images of the egocentric perspective in art of that time. It is the intellectual climate of the European Renaissance, and the logic of geometrical perspective in particular, that take dubious credit for reinforcing our sense of exclusion from the world. Jonathan Crary writes: "Classical representation, from Alberti onward, defines itself by the fundamental subtraction of the body from the constitution of a visual field and the related intellectual distinction between observer and object" [6].

Hailed as a method for accurately re-presenting to the eye what it would see in reality, the application of geometrical perspective necessitated the subtraction of the viewer's self (and that of the artist) because any scene depicted was confined within a rectangular aperture — Leon Battista Alberti's eponymous window [7]. According to Robert Romanyshyn: "The condition of the window implies a *boundary* between the perceiver and the perceived...in addition to the separation between perceiver and world, the condition of the window also initiates an *eclipse of the body*" [8].

Artists, and later photographers and cinematographers, recorded only the central or foveal part of the visual field visible through the notional window, excluding the wider peripheral area, that indistinct part of vision in which the viewer (or artist) would normally see his or her own body [9]. This imaginary window frame has so fundamentally conditioned the way reality is represented in the European tradition — including in our technology — we are oblivious to the restrictions it imposes [10].

Despite excluding the majority of the visual field we happily accept the results as realistic. In one of the great essays on perspective, the art historian Erwin Panofsky noted: “Perspective creates distance between human beings and things [...]; but then in turn it abolishes this distance by, in a sense, drawing this world of things, an autonomous world confronting the individual, into the eye” [11].



**Fig 1.** Ernst Mach's illustration of the ego's point of view, as included in his book *The Analysis of Sensations* (1897). Mach was trying to depict the continuity between his “visual ego,” his body and the world around him. (Source: Internet Archive, <[www.archive.org](http://www.archive.org)> scanned copy of *The Analysis of Sensations*, p. 19)

Probably the first image we have that explicitly depicts the egocentric perspective, showing the natural bounds of vision rather than the artificial window of convention, is the woodcut included by the scientist-philosopher Ernst Mach in *Analysis of Sensation* (Fig. 1). Mach argued that the physical world is not a separate domain from the self. His woodcut is designed to illustrate the integration between the observing ego, the human body and worldly bodies. He says: “The ego can be so extended as ultimately to embrace the entire world. The ego is not sharply marked off, its limits are very indefinite and arbitrarily displaceable” [12]. The drawing reminds us, as Mach must have intended it to remind his nineteenth century readers, that the self-view is constitutive of our entire world-view. But the fact that even some 130 years after its first publication we have so few images of this kind demonstrates continuing ignorance of this perspective.

Like Mach, the phenomenologist Maurice Merleau-Ponty aimed to repair the rupture between mind and body, self and world, often attributed to the Cartesian tradition

within philosophy. In *Phenomenology of Perception*, he accounts for the invisible self by arguing the body has a different status from other entities in the world. For Merleau-Ponty the way I apprehend my body means it is not an object in the ordinary sense. I cannot turn away from it, or look at it from another perspective, as I can with anything else; even in a mirror I see only a simulacrum. My body is not something I can see like a church through a window, but is the very precondition of being able to see anything at all. He says: "I observe external objects with my body, I handle them, examine them, walk around them, but my body itself is a thing which I do not observe" [13]. When we experience external objects in the world what we are actually experiencing is our "ever present and anterior" bodily processes in the act of perceiving. In short, we cannot see what is seeing [14].

The psychologist James Gibson, like Mach and Merleau-Ponty, resisted the assumed separation between self and world. Gibson suggests we erroneously confine the self to one side of a conceptual barrier, beyond which the world in view lies. According to his "ecological" theory of perception, the appearance of the world is conditional on, and indeed partly constituted by, the very self we habitually overlook:

Perceiving the environment includes the ego as part of the total process. In order to localize any object there must be a point of reference. An impression of "there" implies an impression of "here," and neither could exist without the other [15].

Mach's egocentric illustration was an important reference for Gibson. He reproduced it in his treatise on visual perception in 1950 and provided an updated version of his own, which he titled "The Modern Visual Ego" [16]. Gibson's version is designed to emphasize that the visual field is enclosed by an elliptical boundary, including facial features such as the nose and the eyebrows, which he notes are normally seen in the peripheral part of the visual field [17]. This is one way in which Mach's original woodcut and Gibson's version are somewhat misleading as depictions of actual visual experience; both authors (or their illustrators) have rendered objects in the peripheral field quite distinctly.

### **Depictions of the Egocentric Perspective in Art and Visual Media**

Where depictions of the egocentric perspective do occur in art and in visual media they generally fail to capture its full perceptual structure. This is usually because they conform to the conventions of geometrical perspective by excluding the peripheral visual field, which is where of the self-viewed body is mostly visible. On the rare occasions when the peripheral field is included, its indistinctness and its particular spatial structure are not, as I will show below. But these omissions do not necessarily detract from the aesthetic merit of artworks that portray the self-body view; artists seldom have the simulation of vision as their only goal. A brief and selective history of the egocentric perspective in art reveals a variety of intentions behind artists' explorations of the space between themselves and the world that was for so long obscured by geometrical perspective's window.

The art historian Karl Clausberg identifies a seam of thought running through 19th-century German philosophy and science that manifests itself in the paintings of

Adolph Menzel. Clausberg cites a series of drawings and paintings that Menzel made of his own body as symptoms of a more widespread interest in what German philosophers then called the “self-observation ‘I’,” and which Clausberg believes Mach explicitly illustrated in his woodcut [18]. Menzel’s tightly composed observations of his own hands and feet, which can be seen today in the Nationalgalerie in Berlin are, he argues, examples of a rarely acknowledged tendency in the history of art in which artists — from Boccaccio and Rembrandt to Kandinsky and Magritte — rendered the view from the “embodied eye,” which they signaled by the presence of nose-like borders, binocular compositions, or indeterminate fringing [19]. Compared to the Mach drawing, however, the art historical examples he cites are at best suggestive representations of the egocentric perspective.

By the early 20th century we begin to find more overt depictions. Pierre Bonnard’s *Large Blue Nude* of 1924 [20] seems to include his own leg in the lower left corner, while there are several pen and ink drawings of nudes made by Henri Matisse in the late 1930s where his hand appears at the bottom of the page captured in the act of drawing itself — an echo of the self-reflexive pencil in the Mach woodcut. Matisse also partially rendered his own point of view in *Goldfish and Palette* of 1914 [21] which features his hand holding a palette. For Bonnard the inclusion of his self-view would have contributed to the sense of domestic intimacy he sought to portray in his interiors, while for Matisse it was a natural outcome of his direct approach to recording his visual world.

During the 1930s and 40s, the little-known Welsh painter Evan Walters undertook a series of novel experiments in which he aimed to document what he called “total vision” by portraying phenomena such as double vision and peripheral vision, sometimes including his own nose in profile and extreme close-ups of his face seen in a mirror [22]. Coincidentally a contemporary, the American painter Harold Haydon, depicted very similar perceptual phenomena although there appears to have been no connection between them [23]. John Bratby was known at the peak of his fame in the 1950s as one of the “Kitchen Sink” painters, a British school noted for images of mundane scenes and everyday objects. In a letter to a friend Bratby describes his excitement at discovering the pictorial device of painting his own hands in the act of painting, and how it reinvigorated his work at the time [24]. An example is shown in Fig. 2.



**Fig. 2.** *Small Window with Hands* by John Bratby, Oil on board, 60.9 x 60.9 cm, c. 1959, Williamson Art Gallery & Museum, Birkenhead; Wirral Museums Service; gift of Contemporary Art Society 1965. A rare example of an artist painting the egocentric perspective.

The New York-based painter Joan Semmel has portrayed naked or partially clothed figures as seen from the self-view, often her own, as in *Me Without Mirrors* (1974) [25]. Semmel's work gives primacy to the female first-person perspective to counter to the predominance of images depicting the woman's body from the third person, often associated with the "objectifying" male point of view. Also working today in New York are the twin brothers Ryan and Trevor Oakes, who have developed novel ways of transcribing the totality of visual space, including the nose, using a labour intensive method of plotting the binocular visual field [26].

For artists, depicting the first person view of the body may reflect philosophical, aesthetic or poetic concerns, or a fascination with the visual world and how to describe it. Although few addressed the problem of how to depict the egocentric perspective systematically, that they have done so at all is remarkable given the lack

of historical precedent. With the possible exception of some prehistoric relics, these seem to be among the few examples of their kind in the history of image making, which is even more remarkable given the continuous presence of the self-view in visual experience.

Unlike in art, where a variety of motivations for depicting the egocentric perspective can be found, in visual media it tends to have one main purpose: to persuade the audience to identify with character being portrayed. We are familiar with the generic “point of view” shot in cinema and TV, which represents the position a character occupies within a scene, or devices like the “binocular shot” which emulate the view through binoculars, periscopes or gun sights. Of more interest here, though, is a technique in which filmmakers or computer game designers try to simulate a subjective viewpoint using the self-body perspective.

There are a number of notable cinematic examples, including the noire detective mystery *Lady in the Lake* [27] in which the protagonist’s hands, legs, shadow and reflection feature prominently in an attempt to convince the audience they are seeing what he sees. The movie’s trailer proclaims: “The most *thrilling* of all mysteries, and *you* play the starring role.” *Being John Malkovich* aims for a similar effect by inviting its audience into the head of the eponymous character — the poster strap line asked: “Ever wanted to be someone else?” — but achieves it with greater sophistication [28]. It departs from the convention of the rectangular window frame, for example, by using a softened elliptical vignette to indicate the shape of the visual field when showing the first person perspective (as Gibson had in his own version of Mach’s drawing). *Enter the Void* [29] was inspired in part by the director’s viewing of *Lady in the Lake* under the influence of magic mushrooms. Director Gaspar Noé wanted the audience to share the visual experience of a drug taker from the first person point of view, resulting in a claustrophobic and hallucinogenic atmosphere that permeates the movie [30]. *The Diving Bell and the Butterfly* [31] used a number of ingenious props and camera techniques to convey the perceptual experience of the main character, a man completely paralyzed, apart from his left eye. The screenwriter, Ronald Harwood, said he had the idea to turn the main character into the camera, “and the camera should blink, so it would take the audience into his experience of locked-in syndrome” [32]. *Mirror’s Edge* represents a genre of video game that merge the subjective view of the game player with the character being played, in this case a female “Runner” called Faith who is being hunted through a futuristic cityscape. The producers claim: “With a never before seen sense of movement and perspective, you will be drawn into Faith’s world” [33].

The egocentric perspective is usually depicted in visual media by locating a camera (real or virtual) in place of the head [34]. But cameras do not capture the totality of human vision, not least because they are effectively geometrical perspective devices that suffer the limitations noted above, that is, they impose a window on visual space that truncates the peripheral field where much of the self-viewed body is seen. Consequently, such depictions present only a limited portion of self-view, generally excluding the nose or objects in close proximity to the face, such as spectacles or hat brims. Moreover, they misrepresent the relative size of objects compared to how they are actually seen, and hence the perceived spatial structure of the scene.

## **A New Method of Depicting the Egocentric Perspective**

Depicting the egocentric perspective in a way that corresponds to the structure of visual experience is challenging. Currently there is no technology that can capture the entire area of the binocular visual field in a way that appears naturalistic and is practical to display. The full visual field extends some 180° horizontally and 130° vertically when the eyes are fixating straight ahead [35]. Most cameras and imaging systems are limited to capturing much narrower fields of view; a standard 50 mm lens on a full frame camera, for example, will record around 40° horizontal degrees. Fisheye lenses and panoramic stitching techniques can be used to capture wider angles, but these introduce either unnatural “barrel” distortions or highly elongated aspect ratios.

I have been investigating ways of depicting the full scope of the visual field that correspond as closely as possible to how it is subjectively perceived [36]. My method is to fixate on a point in visual space and plot the position of all visible objects relative to that point. I begin by noting the extreme boundaries of the periphery, which determine the scope of the visual space to be depicted, and marking these on an elliptical boundary, similar to the one used by Gibson, which represents the edge of the visual field. I then mark the location of the fixation point within that boundary, which is roughly in the center. While maintaining fixation, I map the size and position of all the objects in the scene relative to that point.

Part of the challenge in this process was learning to draw the indistinct visual space lying outside fixation. There is a natural tendency to look at objects directly when drawing them in order to grasp them clearly. But this had to be resisted, as changing the direction of gaze creates a new and different visual field from the one being drawn. I also became aware that the size of objects varied considerably depending on where they appeared in the visual field. Objects seemed bigger when observed directly, and smaller when seen peripherally. It was hard to suppress the knowledge that objects do not grow as we look at them or shrink when we look away, but it was necessary to do so in order to record the scene as it appeared and not as I knew it to be [37]. Equally problematic was the issue of how to depict the relative indistinctness of the peripheral field. Again, we know objects do not become in themselves less coherent when we look away, but achieving perceptual fidelity required some means of rendering them so. Various methods, including blurring, distressing, deforming, and scrambling were tried but none seemed to match the peculiar optical properties of objects seen peripherally. In the end what seemed to matter most was that the viewer of the picture could discriminate between the clear central area of fixation and the indistinct periphery, irrespective of what method was used to differentiate them.





**Fig. 3.** *Self-portrait (after Mach)*, 2012, oil on formed canvas, 100cm x 150cm. This painting shows the view from my left eye looking at my feet and tries to capture as accurately as possible the subjective appearance of the visual space. (© Robert Pepperell 2012)

Fig. 3 shows a painting made according to the principles described above based on the view from the left eye depicted by Mach. The objects around the point of fixation, my feet, are rendered with increasing indistinctness towards the periphery, although the effect is less pronounced in this reproduction due to downsizing. In addition, the total volume of space captured, covering the entire monocular visual field, is much greater than would be captured using a conventional camera fitted with a rectilinear lens, as can be seen by comparison with Fig. 4, which is shot from the same position and is typical of the depictions of the self-view found in visual media. Moreover, the spatial structure is different from that in a photograph. Fig. 5 shows a view of the same space taken with a fisheye lens (8 mm). Besides the obvious omission of the nose in the photograph, the fisheye lens not only produces more warping, it also changes the size of objects compared to how they are actually experienced, as can be seen when Figs. 3 and 5 are compared. The feet in the painting appear much larger relative to the total picture area and objects in the periphery, such as the iPad and the sofa on the left, are significantly compressed.



**Fig. 4.** A photograph taken with a 50 mm lens on a full-frame camera showing the view of my feet as seen from the same position as the painting in Figure 3. Note the cropping of the peripheral area of the visual field and the lack of differentiation between the fixation point and the periphery in terms of distinctness. This is typical of the kind of self-view found in visual media. (© Robert Pepperell 2014)

Current imaging technologies based on geometrical perspective fail to capture the structure of visual experience, as can be seen by a comparing a directly observed painting with photographs of the same viewpoint. This suggests the need for a new generation of imaging devices that can fully accommodate the scope of human vision.



**Fig. 5.** A view of the same scene depicted in Fig. 3 taken from the same position with an 8 mm fisheye lens and showing the same visual space. While the total physical space shown is similar the size of objects, such as the iPad and feet, are very different, and there is greater warp distortion. (© Robert Pepperell 2014)

## Conclusion

In our culture the egocentric perspective is largely overlooked and rarely depicted. This may be in part due to our sense of estrangement from the world and the legacy of geometrical perspective, which continues to dominate imaging technology and shape our representations of visual reality. Artists have had varied and complex motives for depicting the self-view. But makers of visual media have consistently expressed the desire to simulate first person visual experience in order to replicate a character's point of view [38]. Current methods of doing this based on camera technology, however, lack fidelity to the experience they purport to represent. Representing visual experience more convincingly will mean abandoning geometrical perspective-based devices and developing new forms of capture, synthesis and display that can accommodate the full structure of the visual field, including the self-perceived body.

## References and Notes

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3. Colin Ware, *Information Visualization* (San Francisco: Morgan Kaufmann, 2004), p. 52.
4. LeRoy McDermott. "Self-Representation in Upper Paleolithic Female Figurines," *Current Anthropology* 37:2 (1996) pp. 227-275.
5. According to William Dunning, in *Changing Images of Pictorial Space* (New York: Syracuse University Press, 1991), Medieval artists felt themselves part of pictorial space, unlike their Renaissance successors who "stood outside the world they represented" (p.13).
6. Jonathan Crary, *Suspensions of Perception* (Cambridge, Mass.: The MIT Press, 1999), p. 220.
7. Leon Battista Alberti, *On Painting* (ed. Cecil Grayson, (London: Penguin, 1972) p. 54.
8. Robert Romanyshyn, *Technology as Symptom & Dream* (London: Routledge, 1989), p. 42. Emphasis in original.
9. The way light sensitive rod and cone cells are distributed on the retina in the eye means only a small part of the visual field, where light is focused on the fovea, detects sharp detail. Beyond this acuity drops off rapidly, and objects become less distinct and harder to recognize. As Dunning notes: "Renaissance perspective appears to mimic only foveal vision, and foveal vision is a minute percentage of retinal vision." See [5] p. 36.
10. In *The Virtual Window from Alberti to Microsoft* (Cambridge, Mass.: The MIT Press, 2006) Anne Friedberg notes the dominance of the window metaphor throughout the history of visual media and argues Alberti's window is better understood a virtual viewing frame rather than a transparent aperture through which a portion of reality is seen (p. 30).
11. Erwin Panofsky, *Perspective as Symbolic Form*, tr. Christopher S. Wood (New York: Zone Books, 1997), p. 67.
12. Ernst Mach, *Analysis of the Sensations*, tr. C. M. Williams (Chicago: Open Court Publishing Company, 1897), p. 16.
13. Maurice Merleau-Ponty, *Phenomenology of Perception* (London: Routledge, 2002), p. 104.
14. See [13] p. 106.
15. James Jerome Gibson, *The Perception of the Visual World* (Cambridge, Mass.: The Riverside Press, 1950) p. 226.
16. See [15] p. 227.
17. See [15] p. 27.

18. Karl Clausberg, "Feeling embodied in vision," in *Embodiment and Cognition*, (eds.) John Krois, Mats Rodengren, Angela Steidele and Dirk Westerkamp (Amsterdam: John Benjamins, 2007).
19. See [18] pp. 84-86. Clausberg may have overlooked some drawings made around 1493 by the young Albrecht Dürer of his own legs and hands, examples of which are now held by the Courtauld Trust, London and the Albertina Museum, Vienna.
20. Private collection. Bonnard's *Intimacy* of 1891 (in the collection of the Musée d'Orsay, Paris) almost certainly shows his own hand holding a pipe, resting on his bent leg.
21. Collection of Museum of Modern Art, New York.
22. Evan Walters, "Vision and the Artist," *The Artist*, March to April (1940).
23. 2 May 2014: [www.haroldhaydon.com](http://www.haroldhaydon.com).
24. Bratby to Mary Chamot. London, Tate, Tate Gallery Archives, British Artists, PC4.2.2 Tate Catalogue Files: letter (A22295). The device can be seen in works like 'Painting' of 1958 (Oil on board, Collection Saatchi Gallery, London).
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26. Lawrence Weschler "Double Vision: The Art of Trevor and Ryan Oakes," *Virginia Quarterly Review* 85:2 (2009) pp. 124-139.
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28. Directed by Spike Jonze, Universal 1999.
29. Directed by Gaspar Noé, Wild Bunch 2009.
30. Enter the Void press pack, 2 May 2014: [www.enter-the-void.co.uk/press/ENTER\\_THE\\_VOID-Production\\_Notes.pdf](http://www.enter-the-void.co.uk/press/ENTER_THE_VOID-Production_Notes.pdf).
31. Directed by Julian Schnabel, Pathé 2007.
32. Interview included on *The Diving Bell and the Butterfly* DVD.
33. Mirror's Edge site, 2 May 2014: [www.youtube.com/watch?v=2N1TJP1cxmo](http://www.youtube.com/watch?v=2N1TJP1cxmo).
34. Joanna Quinn's animated short "Dreams and Desires: Family Ties" (Beryl Productions 2006) offers an amusing perspective on the self-view mediated through a video camera.
35. Hans Strasburger, Ingo Rentschler and Martin Jüttner, "Peripheral vision and pattern recognition: A Review," *Journal of Vision*, 11(5):12, (2011) pp. 1-82.

**36.** Robert Pepperell “The Perception of Art and the Science of Perception,” Rogowitz, Thrasyvoulos, & de Ridder (Eds.), *Vision and Electronic Imaging XVII*, (SPIE 2012).

**37.** Subsequent studies have shown this effect is replicated in the work of other artists, including John Constable and Paul Cézanne, and that it may be the result of a number of physiological and psychological processes occurring in perception. For a fuller account see Robert Pepperell & Manuela Haertel “Do artists use linear perspective to depict visual space?” *Perception*, 43 (5) (2014) pp. 395-416.

**38.** This desire is increasingly catered for by manufacturers of the new generation of virtual reality, gaming and entertainment technologies. See for example the Oculus Rift and Sony Morpheus Project, which promise gamers more immersive experiences.

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Robert Pepperell PhD has published several books, many academic articles and reviews, and exhibited widely. He is currently Professor of Fine Art at Cardiff School of Art & Design, UK, and joint Executive Editor of *Art & Perception*.