

SEEING-IN IS A TRANSPARENCY EFFECT

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A note about the illustrations: The colour pictures labelled “supplementary figures” are not intended to be published with the article. They are included with the paper in this format to facilitate explanations and help support certain arguments.

Abstract

Philosophers of art use the term “seeing-in” to describe an important part of our experience of pictures: we often “see” a picture’s subject matter “in” its surface. This paper proposes that seeing-in is an example of a perceptual phenomenon that has received extensive attention in perceptual psychology: the perception of transparency. It is generally accepted that transparency perception is governed by laws of “scission”. I argue that seeing-in is also subject to these laws, and that seeing-in can be understood as a kind of transparency effect. In the process I examine how such a proposal could account for apparent differences between seeing-in and transparency perception – in particular, the fact that we report that picture surfaces seem opaque rather than transparent – and develop a detailed alternative account of the phenomenology of pictures, including not only seeing-in but other forms of pictorial experience.

Introduction

Philosophers disagree on the conditions that must hold for a viewer to understand a picture, but most agree that understanding a picture usually involves the experience of seeing-in: a visual awareness of the picture’s subject matter “in” the picture’s surface. This paper argues that seeing-in is in fact an example of a kind of visual perception that is relatively well-understood by perceptual psychologists: transparency perception. In the case of pictures, seeing-in will typically involve a visual experience of both picture surface and subject matter, so that the subject matter appears as if seen *through* the surface of the picture. I acknowledge that this proposal is unlikely to seem initially appealing: picture surfaces are not typically physically transparent, nor do we usually report that picture surfaces appear transparent. Rather we think we perceive them as they typically are, as opaque surfaces. My proposal is more subtle than it appears in this bald formulation – largely because transparency perception is a more subtle phenomenon than one might first imagine. We shall find, for instance, that transparency perception does not preclude our ability to see picture surfaces as opaque. Still, as it suggests, my proposal does call for an almost complete revision of the current understanding of the experience of seeing-in and by extension, of our experience of pictures.

The plan of the paper is as follows. I first introduce the concept of seeing-in as it is presented by Richard Wollheim, and begin to develop an understanding of it, drawing on the work of John Kulvicki and others, that moves away from Wollheim. I then discuss accounts of transparency perception. Transparency perception is an extensively studied topic in perceptual psychology and it is generally accepted that its phenomenology is governed by laws of “scission” that relate “stimulus” properties to the experiences they can give rise to. I use a range of images to argue that seeing-in

should also be understood as subject to these laws, and that seeing-in should be understood as a kind of transparency effect. In the process I find that seeing-in is a less prevalent part of pictorial experience than Wollheim believed; this is something that transparency perception also helps illuminate. I then make a more detailed examination of a kind of pictorial experience I call imbrication, and its relation to the phenomenon of inflection which has received attention in recent philosophical writing on pictures. I conclude by describing the conditions that distinguish seeing-in from other forms of transparency perception.

1. Seeing-in

Seeing-in, Wollheim held, involves a visual awareness of a surface, Y, and also, simultaneously, a visual awareness of some object, X, “in” the surface.¹ Thus his term “seeing-in”, and his talk of “seeing X in Y”. To describe the double awareness that seeing-in involves, Wollheim enlisted the term “twofoldness”. The twofold character of seeing-in contrasts with what we might call the “single fold” of ordinary visual perception. In his early formulation of the concept he conceived of seeing-in as involving two separate experiences (one of the surface, and one of the object or state of affairs seen in it). He later came to understand seeing-in to be a single experience with two aspects. It is this later conception that I address here. Seeing-in can occur outside the realm of human-made artefacts or arise from an accidental marking, as when one sees a landscape in a cloud formation, or a face in an inkblot. In neither case does the visual awareness of the seen-in object preclude the simultaneous awareness of the surfaces in which they are seen. We remain, for instance, visually aware of the shape, colour, and fluid character of the inkblot, at the same time as we see in it a grotesque face. Of special interest to Wollheim, pictures can occasion seeing-in – in particular, we see in them their subject matter. That is, pictures can occasion a visual awareness of the picture surface – the flat, drawn, printed or painted surface of the picture – and a simultaneous awareness of the three-dimensional arrangement of objects that comprises the picture’s subject matter. Wollheim claimed that seeing a picture’s subject matter in its surface is a necessary condition for understanding the picture. There is significant doubt that seeing-in is involved in every instance of pictorial understanding – in particular it is now widely doubted that *trompe l’oeil* painting arouses this experience – but the idea that seeing-in usually accompanies the understanding of pictures, and ordinarily plays a role in understanding pictures, has become widespread.²

A point about the examples of seeing-in I use: I focus exclusively on seeing-in occasioned by pictures, and not at all on seeing-in arising from natural or accidental

¹ His early account is in Richard Wollheim, *Art and Its Objects*, Cambridge: Cambridge University Press, 1980, supplementary essay 5. The later formulation is found in Richard Wollheim, *Painting as an Art*, Princeton: Princeton University Press, 1987, pp. 46–77.

² See, for example, Martin Kelly, ‘Richard Wollheim’s ‘Seeing-In’ and ‘Representation’’, in Norman Bryson, Michael Ann Holly and Keith Moxey (ed.), *Visual Theory*, Cambridge: Polity, 1991, p. 161; Jerrold Levinson, ‘Wollheim on Pictorial Representation’, *The Journal of Aesthetics and Art Criticism*, vol. 56, no. 3, 1998, pp. 227–33; and Dominic McIver Lopes, *Understanding Pictures*, Oxford: Oxford University Press, 1996, pp. 49–50.

marks. Picture-makers have extensively and systematically explored the diverse ways marks can be manipulated to occasion seeing-in. By comparison, natural and accidental markings only exercise this ability partially and unsystematically. So it is to pictures that an account of seeing-in must primarily address itself if it is to be convincing.

Wollheim would have objected to my proposal. He took seeing-in to be, like ordinary face-to-face seeing, an innate and “biologically grounded” capacity.³ But, at least according to his later view, he did not allow that the phenomenology of seeing-in could be understood in terms of the phenomenology of seeing. “Such a comparison”, he wrote, “seems easy enough to take on, but it proves impossible to carry out. The particular complexity that one kind of experience has and the other lacks makes their phenomenology incommensurate.”⁴ Since transparency perception is straightforwardly an aspect of the phenomenology of ordinary seeing (I will say more about this in the following section), my proposal entails that Wollheim is wrong on this point. I am not the only one to take issue with this incommensurability claim of Wollheim’s. I draw especially on John Kulvicki’s analysis here, as he brings together a range of such arguments, putting them to a purpose comparable in a way to my own (I will say more about this shortly).⁵

Kulvicki points out that for Wollheim, each aspect of seeing-in is an “aspect of *visual* experience, and visual experience presents things as being before one’s eyes.”⁶ But how can two things, picture and subject matter, appear to be simultaneously before one’s eyes without seeming to be in some kind of spatial relationship? The fact that they both appear in a simultaneous spatial relation to the viewer implies that they must also be spatially related to one another. Kulvicki is specific about what that spatial relation is: “there is a strong sense in which depicted scenes seem to recede from the canvas.”⁷ Other considerations suggest the same idea. Kulvicki observes that Michael Podro and Dominic Lopes, among others, have elegantly described how pictures address us in our space, or invite our imagined interaction in theirs.⁸ That point is perhaps an obvious one, but here are two examples I find especially forceful. In the famous recruiting poster, Uncle Sam, in an arresting gesture, seems to point out of the picture’s space, at the viewer. Similar tricks can encourage us to imagine entering a picture’s space. The handle of a knife in a typical Dutch still life seems to point toward us, inviting us to imagine grasping it and cutting a slice

³ Wollheim, 1987, p. 54.

⁴ Wollheim, 1987, pp. 46–47.

⁵ John V. Kulvicki, ‘Heavenly Sight and the Nature of Seeing-In’, *The Journal of Aesthetics and Art Criticism*, vol. 67, no. 4, 2009, pp. 387–97, at pp. 390–392. Although the focus of my discussion in this section is on others, it is worth noting that John Hyman also takes explicit issue with this statement of Wollheim’s. (John Hyman, *The Objective Eye: Color, Form and Reality in the Theory of Art*, Chicago: University of Chicago Press, 2006, p. 142.)

⁶ Kulvicki, p. 391.

⁷ Kulvicki, p. 391.

⁸ Kulvicki, p. 392. Kulvicki draws on Michael Podro, *Depiction*, Yale University Press, 1998, pp. 64, 71, 79, and Dominic McIver Lopes, *Sight and Sensibility: Evaluating Pictures*, Oxford: Oxford University Press, 2005, p. 1.

from the half-peeled fruit that seems to lie a little deeper in the picture's space. Nor are such observations new. Leon Battista Alberti, the Renaissance art theorist, described pictures as akin to windows:

I will tell what I do when I paint. First of all . . . I inscribe a quadrangle of right angles, as large as I wish, which is considered to be an open window through which I see what I want to paint.⁹

Again the implication is that the subject matter seems to lie behind the picture surface. There is an exception, which will come up again at the end of this paper: occasionally, depicted objects seem to occupy a space *in front* of the picture surface rather than behind it. One famous example is found in Caravaggio's first *Supper at Emmaus* (1601, National Gallery, London), in which the surprised apostles seem to thrust limbs and furniture right out of the picture in their surprise.¹⁰ Though it is rarely commented on, the effect is evident in more extreme form in certain anamorphic pictures. The skull in Holbein's *The Ambassadors* (1533, National Gallery, London), for instance, when seen from the correct viewpoint, appears to weirdly float some feet in front of the canvas.

Kulvicki also draws on Robert Hopkins to support his position. Hopkins' remarks are of particular interest because they suggest a way in which Kulvicki's analysis can be refined. Hopkins observes that the viewer "can point . . . at marks on the [picture] surface, thereby identifying objects in the depicted space . . . without having to struggle". So "although distinct", the experiences of real space and depicted space "are neatly integrated"¹¹ The phenomenon is a familiar one. If a viewer of a Last Judgement is asked to point out where Christ is in the depicted scene, they will have no trouble doing so. They point at the picture surface as if through a window, at where Christ seems to be within the depicted space. It is the notion of pointing that allows a refinement to be made to Kulvicki's position. For when asked to point at Christ, the viewer not only points at the place Christ seems to be; in the process they point at precisely the marks on the canvas that depict Christ. Indeed, if one points at any depicted detail in a picture, one finds oneself also pointing at precisely those marks that depict it. To put it another way, when the subject matter seems to exist behind the picture surface the marks appear to overlap precisely those parts of the subject matter they depict. And in cases where subject matter appears to project in front of the picture surface, the depicted objects appear to overlap just the marks that depict them.

While I follow Kulvicki in positing that seeing-in involves a visual awareness of one thing as seen through another, our positions diverge from here. So let me add some remarks about these differences. Kulvicki goes on to claim that we are visually aware

⁹ Leon Battista Alberti, *On Painting*, trans. John R. Spencer, rev. edn., New Haven: Connecticut, Yale University Press, 1966, pp. 55–56.

¹⁰ Art historian Howard Hibbard wrote of this painting: "At the moment of dramatic revelation this disciple [on the left] pushes back his chair in astonished disbelief, in doing so he seems to thrust it into our own space before the canvas . . . The astonished disciple at the right, an unforgettable figure, throws out his arms in a dramatic gesture of amazement so that his left hand seems to cut through the picture plane." (Howard Hibbard, *Caravaggio*, New York: Harper & Row, 1983, p. 77.)

¹¹ Robert Hopkins, *Picture, Image and Experience*, Cambridge: Cambridge University Press, 1998, p. 196. See also Kulvicki, p. 391).

of the picture surface as opaque while simultaneously seeing through it: “seeing-in is a perceptual state in which an opaque object is experienced as being in front of another opaque object even though neither object is obscured by the other.”¹² In this respect our views directly contradict each another. The analysis that I will give shortly of examples of seeing-in can thus be seen as counter-examples to this claim in Kulvicki’s account. There is also a logical objection to his approach. So far as experiencing something as opaque involves not being visually aware of anything through it, there is a contradiction at the heart of his view. Kulvicki rejects this conception of the perception of opaqueness but I find it difficult to part with.¹³

2. Introducing transparency perception

The perception of transparency involves the visual perception of one object through another. As Fabio Metelli puts it, “[o]ne perceives transparency when one sees not only surfaces behind a transparent medium but also the transparent medium or object itself.”¹⁴ Transparency perception has received substantial attention in perceptual psychology. Most of this relates to the visual experience of transparency and the conditions a stimulus must satisfy in order to occasion it. It is this research that I will be referring to. Note that I am not concerned here with the neurological activities that underlie transparency perception, although a literature on this does exist. I will draw especially on Metelli’s widely cited article on the topic, which I have already quoted from, as well as on more recent research. I will say more on transparency perception later; for now let me mention three points that will be relevant to my discussion.

First, transparency perception should be distinguished from physical transparency. A substance is physically transparent if light can be transmitted through it.¹⁵ Crucially for my proposal, transparency perception can occur without the presence of physical transparency.¹⁶ Metelli is clear on this point, and it is worth noting that most of the experiments done on transparency perception since Metelli’s article do not use physically transparent surfaces as stimuli, but rather arrangements of coloured shapes that we are apt to perceive as transparent. (See, for a similar example, figure 1.) This is an important point for my proposal, because pictures (of course) are not generally physically transparent.

Second, in case there is any doubt, transparency perception is a kind of ordinary seeing. Many visible things are physically transparent – and we perceive them as such, that is we see through them to whatever lies behind them. Water and mist are obvious examples in the natural world, and glass and many plastics are prominent

¹² Kulvicki, p. 394.

¹³ Kulvicki, pp. 392–94.

¹⁴ Fabio Metelli, ‘The Perception of Transparency’, *Scientific American*, vol. 230, no. 4, 1974, pp. 90–98, at p. 91.

¹⁵ This is Metelli’s definition (Metelli, p. 91). It should be added that the transmitted light is not scattered, as it is with translucent materials such as frosted glass.

¹⁶ Metelli, p. 91. The reverse is also true: physical transparency need not give rise to the perception of transparency in a viewer. Metelli points out that a physically transparent film laid in the middle of an opaque field of undifferentiated colour will not appear transparent.

examples among manufactured things. Transparency perception helps us understand and so negotiate our physical environment, and it is an ability that most likely evolved in our distant pre-human ancestors.¹⁷ The perceptual psychologist Patrick Cavanagh points out an even more common example of transparency perception, although one that occurs without the presence of physical transparency: shadows are perceived as transparent. That is, the perception of a shadowed surface is ordinarily akin to seeing its surface through a dark film.¹⁸

Third, like seeing-in, the perception of transparency involves a kind of twofold experience. Wollheim's twofoldness involves the simultaneous visual awareness of two different things, such that one appears "in" the other. It thus readily functions as a synonym for seeing-in. I make use of a different conception of twofoldness, that draws on the analysis of the previous section, and replaces the "in" with the requirements of overlapping and visibility that I discussed there. This yields the following definition:

¹⁷ There are studies of transparency perception in animals (this is where neurological work on the topic is done). E.g. R. J. Snowden, S. Treue, R. G. Erickson and R. A. Andersen, 'The Response of Area MT and V1 Neurons to Transparent Motion', *The Journal of Neuroscience*, 11(9), 1991, pp. 2768–2785, considers transparency perception in monkeys; R. J. A. van Wezel, M. J. M. Lankheet, F. A. J. Verstraten, A. F. M. Marée and W. A. van de Grind, 'Responses of Complex Cells in Area 17 of the Cat to Bi-vectorial Transparent Motion', *Vision Research*, 36(18), 1996, pp. 2805–2813 treats transparency perception in cats.

¹⁸ Patrick Cavanagh, 'The Artist as Neuroscientist', *Nature*, vol. 434, 2005, pp. 301–307. Cavanagh elegantly demonstrates this by considering an instance where a shadow is depicted so that it appears opaque. In *The Assumption of the Virgin with Saints Michael and Benedict* by Luca Signorelli and workshop (late 1480s, New York, Metropolitan Museum of Art), the darkened area depicting the shadow cast by Saint Michael's leg appears more like a cut out piece of grey paper laid over the ground than a shadow. The reason for this lies in the way the painter (perhaps a member of Signorelli's workshop) manages the overlap with another shadow. The painting depicts Saint Michael skewering a small devil, such that the shadow of St. Michael's leg is shown overlapping the shadow of the devil's leg. Overlapping shadows reinforce one another (in what I describe below as subtractive colour mixture), so they appear darker in the area of overlap. But the colour of the shadow of St. Michael's leg is not altered where it overlaps the other shadow, giving the impression mentioned above: that we are not seeing a cast shadow, but an opaque surface of the same shape laid out on the ground.

Note also that shadows are not necessarily perceived as transparent. For example, in shadow puppetry, the shadows cast onto the screen from behind do not appear transparent. (I owe this point and example to an anonymous referee.) However, in such circumstances we do not perceive the screen as shaded. Indeed this is the signature effect of shadow puppetry: the shadows appear as opaque, dark animated bodies silhouetted by the bright ground of the screen. So perhaps shadows must be perceived as transparent to be experienced as shadows.

A visual experience is twofold if and only if it is an experience of objects overlapping in which both overlapping and overlapped parts of the objects are simultaneously perceived.

Thus my conception of twofoldness involves the perception of overlapping without the perception of occlusion. It still identifies a crucial feature of seeing-in – relating the two folds of a single experience. But it can no longer be taken as a synonym for seeing-in, for it is also obviously applicable to other experiences. In particular, it also describes transparency perception: we see the overlapped object through the transparent overlapping object, giving us a simultaneous visual awareness of both. (fig. 1)¹⁹ So twofoldness, in my sense, is thus a feature of both seeing-in and transparency perception.²⁰

¹⁹ This figure is intended to show one transparent surface overlapping an opaque surface, but some observers have told me that they see it as *two* transparent surfaces, through which the white ground can be seen. This would be an example of double transparency, which I discuss in section 6 (vi).

²⁰ Let me address another worry upfront that might otherwise nag at the reader. One might wonder why this paper focuses on transparency, when there is another phenomenon close at hand that might seem more like seeing-in: certain kinds of reflection. If I see my face in, say a car bonnet, I will also likely have a twofold experience. That is, I see the glossy coloured surface of the bonnet, and reflected in it I see myself. But like most picture surfaces, reflective surfaces (such as a car bonnet) are often opaque, so could they give a more promising model for an account of seeing-in? The correct response is no. On closer examination, experiences of such reflections turn out to be instances of perceptual transparency. For instance, while the car bonnet is not physically transparent, we *do* have a visual awareness of it as transparent. The experience is much the same as if we could in fact see through the surface (say) a mirror version of oneself behind it (I ignore here the distortion that a convex reflective surface produces). The optics of such reflections involve a fusion mixture of the colours of the reflected surface and reflected object (reflections always make a surface brighter – think of the irritating reflections on a TV screen), and this satisfies a condition for one of the kinds of perceptual transparency that I discuss in section 4.

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Figure 1. Perceptual transparency

3. A challenge

Let me now turn to why it is that my proposal is apt to seem counter-intuitive. As I have mentioned, there are two reasons for this. First is the fact that pictures are not usually transparent objects; rather they are made up of opaque materials: pigments, ink and so on. This concern can be easily dismissed. As I have said, I am not concerned with physical transparency here, but with the perception of transparency, and as we have seen, the latter can occur without the former. Second, and harder to dismiss, is the concern that pictures do not *appear* transparent. For instance, when we examine the brushwork of a painting, it does not seem transparent (say, glassy and see-through); rather it appears opaque. So too with surfaces of other kinds of pictures: the pen marks on a drawing usually do not seem transparent, and while watercolour paint may seem (and indeed be) transparent, the paper visible through it appears as it is, opaque. It is worth noting that Wollheim says nothing to alleviate this concern. “When seeing-in occurs”, he writes, “I am visually aware of the surface I look at”.²¹ This does not imply any kind of unusual awareness of the surface *per se*. The remainder of the paper develops my proposal in a way that aims to address this challenge. Before I am able to do this, though, I first need to examine transparency perception more closely.

4. Laws of scission

According to Metelli, perception of transparent colours (both achromatic – that is, black, white and grey – and chromatic) is governed by a law of scission:

With the perception of transparency the stimulus color splits into two different colors, which are called the scission colors. One of the scission colors goes to the transparent layer and the other to the surface of the figure below. ... there is a simple relation between the stimulus and the

²¹ Wollheim, 1987, p. 46.

scission colors: when a pair of scission colors are mixed, they re-create the stimulus color.²²

Figure 2 shows examples for achromatic colours. (i) and (ii) each give the impression of one transparent square overlapping another. In the areas of overlap, whose colours I indicate by *c*, one surface appears as if seen through another, that is, we perceive colour *a* seen through colour *b* (or vice versa).

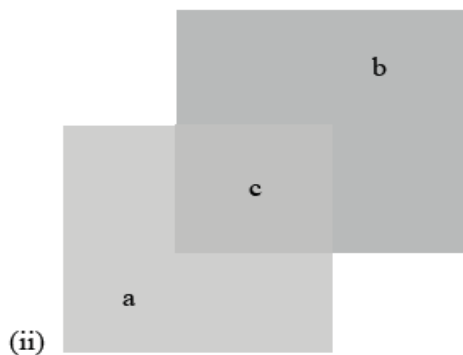
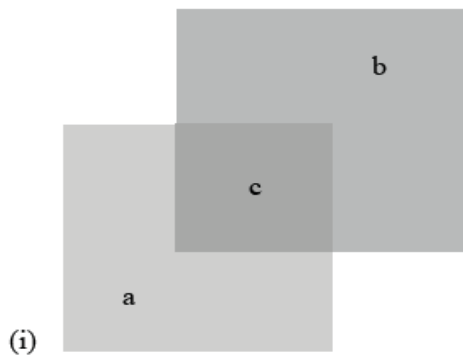


Figure 2. Achromatic transparency.

This law of scission tells us that, so far as each of these diagrams do occasion this perception, the mixture of colours *a* and *b* is colour *c*. It will be apparent that this formula holds in different ways in (i) and (ii), for while *a* and *b* are the same tone in both diagrams, *c* is not. In (i), *c* is darker than both *a* and *b*, and in (ii), *c* is a tone midway between *a* and *b*. Different kinds of mixture are thus operative in each of these diagrams. For this reason it will be better to talk of laws (rather than a single law) of scission. In (i) *c* is a subtractive mixture of *a* and *b*; in (ii), *c* is a fusion mixture of *a* and *b*. Both kinds of mixture can produce the effect of transparency, and

²² Metelli, p. 93.

both correspond with instances of transparency perception in the natural world.²³ Fusion mixture can be observed when a disc with segments of different colours is spun so that these “component” colours appear to blend or “fuse” into a single colour that occupies a midpoint between the tone and chroma of the component colours. This corresponds to the transparency observed when something is seen through a haze or fog. Subtractive mixture is familiar from the superimposition of coloured filters or gels. Light passing through a coloured filter has components subtracted from it. A filter will subtract brightness, and may also subtract aspects of hue (a red filter, for instance, will tend to subtract those wavelengths that fall outside those that give rise to the perception of redness. This corresponds to the effects of transparency when shadows overlap. It is widely accepted in the literature on transparency that the same two kinds of mixture – fusion and subtractive mixture – will also produce chromatic transparency perception.²⁴ It has more recently been found that other, related changes in colour can also achieve transparency effects.²⁵

A similar law applies to the perception of texture. Takeo Watanabe and Cavanagh point out that “[w]e see textures overlapped wherever there are transparent ... structures interposed between the viewer and a background surface.”²⁶ They observe that, like colour transparency, we can often perceive this overlap not as a new composite texture, but as one texture seen through the other: “We are able to decompose one texture from another even if parts of them are overlapped.”²⁷ Figure 3 shows an example of texture transparency. Texture is schematically indicated by dashes. Where the two textures interpenetrate, we do not tend to see a new composite texture; rather we see one texture through the other. Texture transparency can thus be understood to accord with a similar law of scission, in that the mixture of the texture used to depict the overlap is a composite of the two textures used to depict the non-overlapping areas.

²³ Metelli’s focus is on fusion mixture. Others have stressed subtractive mixture. (J. Beck, ‘Additive and Subtractive Mixture in Color Transparency’, *Perception and Psychophysics*, vol. 23, 1978, pp. 265–67; J. Beck, K. Prazdny and R. Ivry, ‘The Perception of Transparency with Achromatic Colors’, *Perception and Psychophysics*, vol. 35, 1984, pp. 407–22.)

²⁴ M. D’Zmura, P. Colantoni, K. Knoblauch and B. Laget, ‘Color Transparency’, *Perception*, vol. 26, 1997, pp. 471–92, at pp. 471–72.

²⁵ These are described by D’Zmura et al. Fusion can be understood as a convergence to a point in colour space between the overlapping colours; however, “[t]he point to which colors converge can vary over a wide range and still lead to the perception of transparency.” (p. 478) Subtractive mixture can be understood as a particular kind of “translation” in a direction in colour space involving a decrease in luminance; but this decrease “is not necessary for the perception of transparency. Translation in any direction of color space will work.” (p. 477)

²⁶ Watanabe and Cavanagh, ‘Texture Laciness: The Texture Equivalent of Transparency?’, *Perception*, vol. 25, 1996, pp. 293–303, at p. 293.

²⁷ Watanabe and Cavanagh, p. 293.

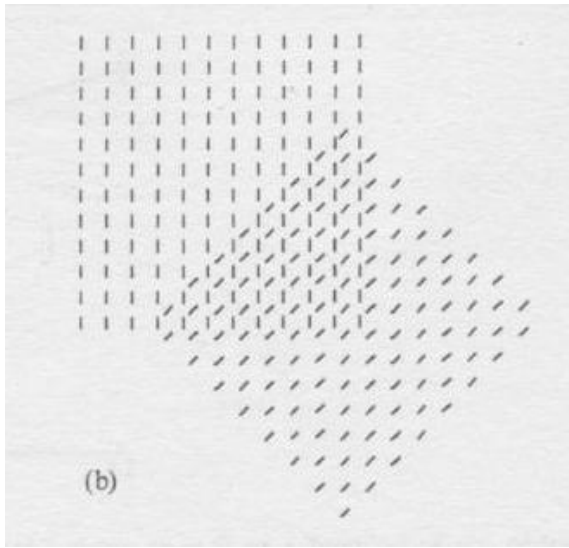


Figure 3. Texture transparency. Watanabe and Canvanagh, p. 294, fig. 1. (b).

Note that these conditions are not the only ones necessary to arouse perception of transparency. Metelli, for instance, also identifies certain “figural” conditions for perceptual transparency which hold in the above examples.²⁸ I will not dwell on these here. The kinds of examples I discuss below differ from the geometrical ‘mosaics’ Metelli (and most others) use to study the topic, so the figural conditions he proposes are not readily applicable. Nevertheless I allow that further conditions beyond those laws I have discussed may be required to establish the perception of transparency in the examples I will examine.

Before moving on let me address a concern philosophers may have about the treatment of colour here. For Metelli, stimulus colours are the “original” colours of his mosaics.²⁹ They are properties of surfaces such as luminance under particular illumination. This suggests that he identifies them with objective properties. However, scission colours are, in the case of Metelli’s mosaics and in other cases I will consider, subjective effects. This is apt to make philosophers uneasy: for how can any mixture of subjective effects be expected to give rise to something that accords with an objective measure, such as luminance? Although it is tempting to present the law of scission in more philosophically robust terms, I will not do so here, for this concern about its formulation can, with care, be put to one side. That is to say, in this context, the distinction between subjective and objective is not especially important. I say this for two reasons. First, objective properties, such as luminance, under certain constraints and with particular exceptions, will relatively reliably produce certain subjective effects (such as the perception of lightness and darkness) that accord with the objective state of affairs. Second, subjective colour effects can be compared to these veridical perceptions, and where a match occurs, we can consider the colours as having the same luminance.

²⁸ Metelli, pp. 92–93.

²⁹ Metelli, p. 93.

Both these points are implicit in Metelli's approach. Regarding the first point, Metelli allows that colours, including under certain circumstances stimulus colours, can be perceived truthfully. In particular, the stimulus colour can be perceived when transparency is *not* perceived (I will return to this point in the next section).³⁰ Turning to the second point, we have seen that with the mosaics that Metelli and others use, the scission colours cannot be objectively measured, since they are subjective phenomena. But these colours can for the most part be reliably matched with coloured objects that *do* lend themselves to objective measurement, and the law of scission can be confirmed in this way. So in figure 2 (i), under a given illumination, the brightnesses of *a*, *b* and *c* can be readily measured objectively. However, the brightnesses of the scission colours, being subjective, cannot be so measured. Nevertheless the diagram can be used to measure these colours in another way, since viewers can assess whether tone *c* produces an impression of transparency in which tone *a* appears to be seen through tone *b* (or vice versa). In this way the viewer can assess whether the colours of the subjective scission effect match the objectively measurable tones *a* and *b*.

Obviously, this easy movement between thinking of colour as objective and as subjective relies on an assumption that the objective and subjective are here closely linked. If that assumption is right, and I think it is in this context, the ambiguous approach that we find in Metelli and others will be harmless, or largely so. ~~I think we must take it that this is the case, for otherwise scientists would have done away with this ambiguity themselves.~~

5. Application to seeing-in and other pictorial experience

I propose that seeing-in can be understood as a kind of transparency perception governed by laws of scission. That is:

When seeing subject matter in a picture surface, the visible properties of the picture surface are experienced as separated into two sets of scission properties. One set of properties is attributed to the picture surface, and the other to the subject matter.

It will also be useful to apply this to the *sections* of the picture surface:

The visible properties of a section, *S*, of the picture surface are separated into one set of properties that is attributed to the section of the subject matter that *S* depicts, and another set of properties that is attributed to *S*.

In both cases, scission accords with the rules that govern transparency perception. So the scission properties, subjected to the appropriate kinds of mixture described in the previous section, will re-create the stimulus properties.

Let me now turn to the concern that we do not perceive the picture surface as transparent. The first thing I should make clear is that my proposal does in fact contradict this. This goes against our common sense notion of pictures – that they are not experienced like panes of glass. It also goes against Wollheim's implication and

³⁰ Metelli, p. 91.

Kulvicki's explicit avowal: that we are aware not only of the picture surface, but of its colour, and indeed, opacity. Now, my proposal does in fact allow that we can also be visually aware of the picture surface as being an opaque surface having the colours it does in fact have. However this awareness cannot be simultaneous with a visual awareness of the depicted subject matter. That is, the full awareness of the picture surface, where it occurs, will alternate with the awareness of the surface as transparent. Metelli allows for such an alternating awareness in transparency perception: "[i]f the region of superimposition [is isolated] (even if it is just by the attitude of the observer), then only the [stimulus] color is perceived."³¹ So too, if we isolate the picture surface, by covering all except a patch of paint, or by moving in very closely, or "even if it is just by the attitude of the observer" my proposal allows that we can have a visual awareness of the picture surface as coloured and opaque.³² So rather than saying that we are never visually aware of the picture surface as opaque, I claim that we cannot at the same time be visually aware of the picture surface as opaque, and be aware of the subject matter.

Metelli notes the existence of "limiting cases" of transparency, and these also have pictorial counterparts. He states: "If all the color goes to the transparent layer, it becomes opaque. If all the color goes to the underlying surface, then the transparent layer becomes invisible. Transparency is perceived only when there is a distribution of the stimulus color to both the transparent layer and the opaque layer."³³ In the first pictorial counterpart, *no* properties are attributed to the subject matter; the surface remains opaque in its appearance, not just intermittently, as discussed above, but permanently, and so neither seeing-in nor pictorial understanding occur. This is therefore a kind of pictorial failure; we would merely see the surface as it actually is. In the second pictorial counterpart, *all* the picture surface's visible properties are attributed to the subject matter, and the viewer loses all visual awareness of the picture surface. The picture surface will seem to have something of the quality of a clear pane of non-reflecting glass through which the subject matter is seen. Neither of these experiences are twofold, and so neither are examples of transparency or seeing-in. However, I will talk about the latter case in detail since it is predicted by my account, and because some pictures do occasion this experience. Clear instances are pictures that tend to occasion a mistaken belief in the viewer that they are in fact in the presence of the subject matter, such as some *trompe l'oeil*. As Dominic Lopes notes, "*trompe l'oeil* demonstrates that what it is like to see an object in a picture need not be discontinuous with what it is like to see that object in plain sight."³⁴ Other kinds of pictures can also preclude visual awareness of the picture surface *per se*. Certain Dutch and Flemish paintings (such as those of Jan van Eyck) have a feature that can be imperceptible to ordinary vision, and the same can be true of colour photographs with a fine grain. These do not tend to deceive us (we know they are in

³¹ Metelli, p. 91.

³² This aspect of my account bears comparison with Gombrich's idea of picture perception as alternating between awareness of the picture surface and awareness of the subject matter. (E. H. Gombrich, *Art and Illusion: A Study in the Psychology of Pictorial Representation*, London: Phaidon Press, 1960, pp. 3–6.)

³³ Metelli, p. 94.

³⁴ Lopes, 1996, p. 49.

fact a flat, manufactured surface), but especially at a distance they can preclude *visual* awareness of their surface.³⁵

Let me consider in detail one such case, the reproduction of the photographic image of a glass of milk that features on various Penguin Modern Classics editions of Anthony Burgess's novel *A Clockwork Orange* (supplementary fig. 2). The milk is depicted by a white, or slightly grey colour. Here my claim is that this colour is wholly attributed to the subject matter – the milk – which appears as if a little behind the picture surface. While we have this experience, the picture surface appears as if it lacks all its colour properties, that is, it appears wholly transparent. Note that in this case, and in others I will consider below, my claim is not that we see different colours when we alternate between a visual awareness of only the picture surface, and a visual awareness that incorporates the subject matter. Rather, we attribute the same colour to different objects – we experience the white colour as belonging to the picture surface in the first instance, and in the second instance, to the subject matter's surface, to the milk.

The difference between these two experiences can be directly compared. Various versions of the cover include in the design a strip of white above or below the photograph, or in a later version white text overlaying the photograph. In all cases this white is a similar (sometimes slightly brighter) colour to that which depicts the milk, but it has no depictive content; we see it only as a feature of the surface of the cover design or text. Compare this to the white colour we see the milk as having. In these two cases, we experience much the same colour, but attribute it to a different object. My claim is that when visually aware of the milk, we have no visual awareness of the white as belonging to the picture surface, as we do when we examine the white stripes or text of the cover design. Rather, the white colour appears pushed back a little way into the virtual space of the picture, attached to the surface of the milk rather than the book cover.

It could be objected that we do retain an awareness of the surface as white and opaque. I would agree with this, but with the crucial qualification that this awareness is not at that moment part of one's *visual* experience. Consider here the glass depicted in the photograph through which the milk is seen. Where it lies over the area of the milk's surface that I am concerned with it is quite transparent: we have no visual awareness of it. I suggest that our visual experience of the subject matter through the picture surface is comparable to the visual experience of seeing the milk through the glass. We seem to see the milk through the picture surface just as we seem to see it through the surface of the glass. What is markedly different in the experiences of these things is not part of the visual phenomenology, but of other kinds of awareness. We know of the presence of both surfaces (through various contextual cues, our prior experiences and so on); we are aware of what kinds of surfaces they are and where they are; but in neither case do we have a visual awareness of the surface.

6. Case studies

I now turn to examples of seeing-in, starting with relatively straightforward cases, and progressing to more complex and challenging examples for my proposal. In addition

³⁵ For further discussion of such pictures, see [Author publication 1].

to the expected instances of twofold perception, we shall on closer inspection find among them further examples of “onefold” picture perception.

(i) A glossy photograph

The flat, glossy surface of a photograph, or of other pictures, such as the book cover, will under certain viewing conditions have a reflective shine to part of the surface, through which one can nevertheless make out the picture’s subject matter. The effect of such partial reflection is no longer like looking through non-reflective transparent glass, but usually like looking through a white veil or mist. Here, the colour associated with the reflection is usually attributed to the picture surface, while the other colours are attributed to the subject matter. Partially reflected light will produce a fusion mixture between its colours and those of the reflective surface (since it involves the mixture of light). So this example straightforwardly accords with a law of scission, for a fusion mixture of the scission colours will here recreate the stimulus colour.

(ii) A sepia photograph

I take it that a sepia toned photograph will usually be experienced not as depicting yellowish subject matter, but as being non-committal about its subject’s hues. The experience can be likened to that of seeing the subject matter through a filter-like device that translates all the hues into corresponding shades of yellow.³⁶ Here the picture surface’s hue (that is, yellow) is attributed to the picture surface, while the surface’s tonal properties are attributed to subject matter. This example also straightforwardly accords with the laws of scission, for a subtractive mixture of yellow with an appropriate variety of white, black and grey tonal properties will result in the variety of yellowish tones that actually characterise the picture surface.³⁷

(iii) Paintings with visible brushstrokes.

This is a more complex case, but it is also a crucial one for my proposal, since the experience of paintings with visibly impasted brushwork are a typical Wollheimian example of seeing-in.

My account here has two parts. The first is the obvious one implied by my proposal: that we experience the brushstrokes’ colours as belonging to the subject matter, while their textures are attributed to the picture surface. Seeing-in here involves an awareness of the brushstrokes covering the picture surface as transparent textures through which the colours of the subject matter are seen. The experience, visually, is like seeing the subject matter through textured glass.

³⁶ Note that this is slightly different from an actual yellow filter, which would produce a slightly different appearance placed in front of the subject matter, darkening the appearance of non-yellow colours, and making blue appear black.

³⁷ I do not want to suggest that sepia photographs depict things as black, white or grey. To be black, white or grey is to lack hue, and so is committal about hue. But sepia photographs (and black and white photographs for that matter) do not depict their subject matter as lacking hue (i.e. as depicting a black and white world). Rather they are silent about what hues their subject matter has.

I think it is clear that we do experience certain parts of some pictures in this way. The effect is readily observed when the subject matter is not itself textured. For instance, when a clear blue sky is painted with visibly discernible blue brushstrokes, the blue of the sky appears as if seen through a textured, but otherwise perfectly transparent surface. [This can be seen in supplementary figure 3. So far as one can see a clear blue sky in such an image, the textured effects of the brushstrokes will be seen as a textured, transparent surface through which that sky is seen.] Occasionally the entire surface of a painting can promote this textural scission. Those with a thick, broadly brushed undercoat and a thinly painted picture over the top can achieve this effect. The effect is most clearly seen in a context, somewhat outside painting, where it is achieved systematically: in certain kinds of mass produced prints, such as the “oilette” postcards published by Raphael Tuck & Sons in the early twentieth century [supplementary fig. 4]. These are reproductions of paintings, printed on card embossed with a brushstroke pattern. The embossed pattern of brushstrokes gives the impression of a transparent texture through which the subject matter of the reproduced painting is seen.

However, most paintings do not afford such experiences. The brushwork in many paintings, such as Rembrandt’s *Self-Portrait as the Apostle Paul* (1661, Rijksmuseum, Amsterdam) [supplementary figure 5], appears for the most part not as a transparent surface, but as closely imbricated with the subject matter it depicts. The second part of my analysis is addressed to this. Watanabe and Cavanagh, in their work on the perception of texture transparency, identify conditions under which scission does and does not occur.³⁸ Of interest here, when elements of overlapping textures line up with one another and are of the same size, scission tends to be resisted, and the viewer instead is more likely to perceive a single composite texture at the area of overlap. In figure 4, the left hand diagram shows this phenomenon, while the diagram on the right shows that the oblique orientation of the elements increases the impression of transparency.³⁹

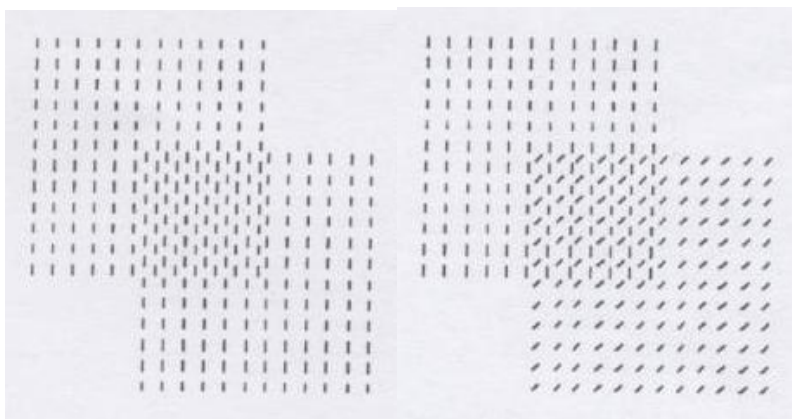


Figure 4. Watanabe and Cavanagh, details from fig. 5, p. 296.

³⁸ Watanabe and Cavanagh, op. cit.

³⁹ Watanabe and Cavanagh, pp. 294–97.

Comment [H1]: In fig. 4, we don’t see the composite texture as belonging to one of the two squares.

Yet, when you draw a parallel with Rembrandt you do claim that the composite texture is seen as belonging to the subject matter and not the surface of the painting.

Isn’t this an important disanalogy? (The two squares are supposed to be the equivalent of the surface and the subject matter of a painting, right?)

In relation to this: when scission is resisted, as in the left hand figure, it makes it more difficult to see the entire squares as overlapping. Yet, in the case of Rembrandt, as you point out, the fact that scission is resisted in certain areas does not prevent transparency perception in other areas.

The relation of the embossed brushstrokes of the oilette with the depicted textures of its subject matter satisfies Watanabe and Cavanagh's conditions for scission. The embossed brushstrokes, readily apparent, especially in raking light, are much larger than the depicted textural elements (clumps of foliage, puffs of cloud, in a typical Tuck & Sons image), and rather than being oriented the same way, they cut across them. Accordingly, we tend to experience the textures of the embossed brushstrokes as belonging to a transparent surface, through which the finer textures of the subject matter itself are seen. The painting of a patch of blue sky or a smooth surface allows a similar analysis, since the texture of the painting is wholly unrelated to lack of texture the subject matter.

The Rembrandt provides a contrasting example. The brushstrokes, in terms of size, shape and orientation, often function as equivalents for the textures of the depicted subject matter. They do not reproduce the texture of the subject matter **in any exacting way – indeed they remain recognizably the textures of brushstrokes –** but they present a comparable 'grain', and run in the same direction as the textures of the subject matter. Most prominently, the long curving folds of the turban Rembrandt wears are depicted with long curving brushstrokes. His brushstrokes also follow the wrinkles of his forehead, the individual strokes often matched to individual bulges of flesh, and the curls of his hair are traced with similarly curling lines of paints.

At the same time that the paint's texture is used in this way, Rembrandt also manipulates tone to depict textures. This is done in the familiar way that other kinds of forms are modelled using tone: illuminated parts of the texture are rendered using a lighter tone, and shaded parts in a darker tone. Now, a critical point: to a significant degree the marks used to lay down these areas of tone and the textural marks I have discussed are the same marks. That is, in the process of creating the patterns of tone that depict textural qualities, Rembrandt lays down these textural marks.

Watanabe and Cavanagh's work suggests that we should not be surprised to find that this combination of techniques acts to resist textural scission. Where tone and texture are laid down in the same strokes, as we see in those sections of Rembrandt's self-portrait that I have mentioned, the elements of the depicted texture and actual texture will be similar in size and orientation, and so they are attributed to a single surface, that of the subject matter.⁴⁰ Here the textures of the paint appear imbricated with the

⁴⁰ There is also an important disanalogy between the textural transparency described by Watanabe and Cavanagh, and our perception of the Rembrandt. In fig. 4, we do not tend to see the composite texture as belonging to one of the two squares; rather it appears to belong to a third surface. But with the Rembrandt, the composite texture does not give us a visual awareness of such a third surface that is neither the surface of the picture nor that of the subject matter. In this case we have an awareness of only the single composite texture, and we experience this as occupying the space of the subject matter.

This is partly related to the fact that picture surface and subject matter appear to precisely overlap. Hence the composite texture we in a Rembrandt perceive does not sit side by side its components as in fig 4.; rather it entirely incorporates them. That still leaves the question of why we should see this composite texture as within the picture space, rather than (say) on the picture surface. I will leave this detail unexplained here, as I don't see that Watanabe and Cavanagh's account – developed

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subject matter in its own space. This creates the appearance of a composite texture, comprised of the texture that the picture is depicted as having through the manipulation of tone, and the texture of the paint, which we also attribute to the depicted surface.⁴¹ More needs to be said about what the experience of imbrication is like, and how it relates to the experience of the individual components. I return to these questions in section 7. For now, note that my analysis shows that this kind of experience is, contra Wollheim, *not* twofold. Where paint texture is seen not as a feature of the picture surface, but as imbricated with subject matter, there is no twofoldness, and no seeing-in.

To sum up, for paintings with textured brushwork, my proposal is that pictorial experience involves either one or other of the two kinds of experience I have described. Different parts of the same painting may sustain different kinds of experience (perhaps the more summarily painted parts of Rembrandt's self-portrait, such as the background, act in the first way.) My proposal also allows that the experience of a single part of a picture, depending on the attitude of the viewer, can alternate between both types of experience.⁴²

(iv) Pictures in a "flat" style

I have in mind here Post-impressionist paintings such as those of Gauguin, Synthetism and Cloissonism, many of the mature paintings of Matisse, Romanesque and Byzantine painting, and pictures made in stained glass (provided the glass is translucent or opaque). The surfaces of these pictures have in common simple, clearly defined shapes made up of large areas of "flat" relatively unmodulated colour. I find it is with these pictures more than others that it is tempting to say that one does have a simultaneous perception of surface and subject matter. Take the famous stained glass window in Canterbury Cathedral *Adam Delving*. [supplementary figure 6] It is easy to accept that we remain visually aware of the pieces of glass fastened into the irregular lattice of lead while at the same time seeing Adam labouring away in his brilliantly coloured Eden. But that would contradict my proposal – so what can I say about such examples?

The key to overcoming this concern lies in understanding that the subject matter depicted in these pictures does not have a fully realized three-dimensional character. Rather the depicted surfaces appear flattened and oriented towards the picture surface, and the space which the depicted objects occupy seems shallow. Objects appear to overlap one another rather like flat cut-out shapes in a shallow stage set. There is no impression of the depth of, say, Renaissance painting or Rembrandt. The subject matter we see in such pictures is already quite picture-like in a sense: it seems to take

to account for rather simpler perceptions of texture (in particular, perceptions of flat textured surfaces rather than volumetric textured surfaces), provides the resources to explain this.

⁴¹ It is worth adding that this gives the painting a sense of physical presence that it would not otherwise have (A photograph of a similar subject lit with similarly dramatic, raking light, would not give the same sense of presence as Rembrandt's painting.)

⁴² My own sense is that this does happen when brushstrokes only roughly follow depicted forms.

on much of the flatness of the picture surface, and appear as if pressed up against the picture surface, if almost coinciding with it.⁴³

Once this is understood, it becomes easier to see how the approaches I have already worked out apply here. Take *Adam Delving* again. If we examine our experience of it carefully, I believe we will find that it will accord with either one of the two accounts I gave in (iii); my own sense even from a photographic reproduction where facture can be clearly made out, is that the actual surface seems entirely transparent, and the colour and texture properties of the surface go to the subject matter. Because we see the subject matter as lying only just behind the picture surface, we do not so readily notice that we are “mis-seeing” the surface. Here is a way of testing this claim: while maintaining the subject matter in your visual awareness, ask yourself how the pieces of glass or (in the case of a painting) the painted shapes on the canvas appear to relate to one another. So far as one does succeed in maintaining a visual awareness of the subject matter, one will see them as instantiating the depicted spatial relations. That is, where a figure is depicted in front of another object, the viewer will see the one area of colour as overlapping and slightly in front of the other. In the case of Adam’s pole-like legs for instance, the translucent glass pieces that depict them usually appear as bright but opaque areas of colour (something visible even in reproduction). These colours seem to be a little closer than, and overlapping, the blue background. This is a misperception of the actual window of course, but to visually experience the real relations of the pieces of glass, one must lose awareness if only for a moment of the subject matter as having any three-dimensional spatial presence. The window’s parts are then reduced in the viewer’s awareness to just what they are, shaped pieces of glass that at the most give us the flat outline of legs in a two-dimensional arrangement.

(v) Pictures using hatching

Hatching primarily involves the use of multiple, usually roughly parallel lines to depict areas of tone. I treat crosshatching, which involves overlaying sets of such parallel lines so that they intersect, as a version of hatching here. Hatching is primarily used to depict areas of tone, and so is important in modelling three-dimensional forms. The denser this hatching – that is, the less bare paper is visible – the darker the depicted tone will be. (Here I assume that the hatching comprises dark marks on light paper.) Hatching is made denser through the application of more marks, or by increasing the width of those marks. Seen from a distance, the dark lines of ink or pencil are subject to optical fusion, appearing to blend with the exposed pale colour of the paper into a smooth homogenous tone. In practice though, we usually see prints and drawings at fairly close quarters. Under these conditions, we rarely lose visual awareness of the individual lines that make up hatching, but *they still occasion an experience of tone*. It is this simultaneous awareness of hatching and the tones it depicts its subject matter as having that I analyse here.

My analysis is comparable to that I made of texture in painting. We may (a) perceive the hatching as a web of lines characterising the picture’s surface, through which is

⁴³ John Willats gives a detailed account of the various methods artists have for achieving these effects. John Willats, *Art and Representation: New Principles in the Analysis of Pictures*: Princeton, New Jersey: Princeton University Press, 1997, ch. 10.

seen the subject matter. Or (b) we may perceive the hatching as imbricated with the subject matter – that is, translated into the virtual space of the picture, as part of the textural warp and weft of the subject matter’s surface. As with painting, different parts of a hatched picture’s surface may be experienced in both the ways, and our experience of an individual part may also alternate between the two kinds of perception, depending on the nature of our attention to the picture.

However, hatching requires a more complicated analysis than painterly brushwork because much of it depends for its depictive effect on subjective phenomena. This can be most readily appreciated by considering how an area of hatching can serve to depict a surface as having a mid-tone. Consider figure 5, which shows a detail of the portrait of George Washington on the US one-dollar bill. If one looks at this detail from a distance that does not allow optical fusion – and as I have said this is how we typically view drawings and prints – we retain an awareness of the darkness of the hatched marks themselves and the lightness of the paper in between those marks. Now, there is nothing in the experience of the marks in themselves that corresponds to the mid-tones of say, Washington’s face. If the viewer stands at some distance, this problem is solved by optical fusion, whereby the pattern of light and dark of ink and paper is processed by the visual system in such a way that it becomes invisible, and a pattern of mid-tones is instead perceived. But how does this pattern of dark and light serve to produce a mid-tone at closer quarters, where the pattern of the hatching remains visible? There is no doubt that there is a subjective effect at work here. Compare the tone of the wisps of white hair (especially on the right of this image), with the general tone of Washington’s face. The face seems darker than the hair. But if one looks more closely at the image to find the source of this effect, a curious phenomenon becomes apparent. Compare the paper on which the hair is depicted with that on which Washington’s face appears: the former seems not white but slightly grey in comparison to the white of the paper on which the hair is depicted. This is an optical illusion, as can be verified by inspection at even closer quarters (under a magnifying glass for instance): the paper on which it is printed is of a uniformly light tone. This illusion is a kind of “spreading” effect, as it is termed in perceptual psychology.⁴⁴ In the case of hatching this would make the dark hatched marks seem lighter than they actually are, and (more strikingly) make the light, unmarked paper seem darker than it actually is – just as we have seen occurs in the picture of Washington.

⁴⁴ This is perhaps an instance of the Bezold effect. This occurs when two colours or tones are interspersed: the colours or tones are perceived as more similar to one another than they otherwise would be. (Ralph Merrill Evans, *Introduction to Color*, New York: John Wiley & Sons, 1948, p. 181.) The Bezold effect is sometimes described as the opposite of simultaneous contrast, which results from the juxtaposing of larger regions of colour.



Figure 5. US one-dollar bill, detail.

A spreading effect can produce not just a single tone, as it clearly does here, but all the variations of tone needed to make a depiction. This can be readily seen in another print, which will also provides an example of experience (a), that is, an experience of the hatching as a web of lines characterising the picture's surface, through which the subject matter is seen. The print is Claude Mellan's remarkable engraving *The Sudarium, or Veil of St Veronica* (1694) (fig. 6).⁴⁵ Mellan's form of hatching is notable for a number reasons. Though it does not bear directly on my discussion, this image is famous for being composed of a single line, that spirals outwards from the point depicting the tip of Christ's nose. Note too that it is not variation of the density of the lines that is used to indicate changes in light and darkness, but solely the variation in the width of the line used. Mellan's self-imposed constraint means that for the most part the spiral of the line is quite unrelated to the forms it depicts. Its thickening and thinning aside, the line passes indifferently over the varying contours and discontinuities of the depicted forms.

⁴⁵ A high resolution image can be downloaded from the British Museum website.



Figure 6. Claude Mellan, *The Sudarium, or Veil of St Veronica*, 1694, detail.

For reasons mentioned above, this would seem likely to give rise to a scission effect, and indeed it can do so. If one focuses on the beginning of the spiral, from a close viewpoint, much of the inner part of the spiral can be held in the visual awareness. At the same time, between the spiralling line – that is, on the unmarked part of the picture surface – the somewhat ghostly form of the depicted face can be seen. The effect appears best in the periphery of vision. Fixating on a particular area tends to dispel the effect at that point: so, looking right at the start of the spiral on the nose of Christ, it appears merely to be a curling line on blank paper, but around that spot, away from the centre of one's vision, the form of Christ's face appears as if present behind the spiral.

Again this involves a subjective effect, for the paper itself, in between the printed lines, is quite blank. The broadening of the line causes a subjective darkening of the adjacent white area, creating the impression of smoothly varying areas of tone. While this seems to be a kind of spreading effect, it also appears to differ from the Bezold effect (as I mention below). The following observations are therefore tentative. Two features of this experience seem to me especially notable. First, the face itself seems relatively pale – more so than it appears at a distance from which the lines optically fuse into a continuous tone. Second, and perhaps more curious, so long as one maintains the visual awareness of the forms of the face, the spiral line appears to be fairly constant in width. That is, while we have a clear visual awareness of the line, we lack a clear visual awareness of its broadening and thinning. The broadening out of the line seems to have been “displaced”, contributing now to the spreading effect.

Whatever else can be said about these two phenomena, they can be related by the law of scission, provided we accept one assumption: that the overall luminance of the

picture surface is maintained, or largely maintained, by the spreading effect.⁴⁶ Under that assumption, the thickening of the line evades visual awareness because its constituent tone is subjectively spread into the adjacent areas in between the spiralling line, and attributed to the forms of Christ's face. The face appears relatively pale because it is only the tone associated with the thickening of the line that is attributed to the subject matter. It appears rather darker at a distance, because through optical fusion, the spiral's overall darkness, rather than just that part expended in the spreading effect, is assimilated to the face.

However, as I have said, hatching rarely produces such an experience of scission, Instead it is an experience of kind (b) that is typical, and this can be seen clearly in the picture of Washington. Here, as in most hatched pictures, line is used in ways that trace the contours, planes and textures of the subject matter rather than cutting across them. In the portrait of Washington lines follow the strands of his hair, "bracelet" shading follows the rounded contours of his face, stippling is suggestive of its texture, and a group of near vertical parallel lines on the left side of his face define the plane bounded by cheekbone, chin and jawline. Much as the textural effects of Rembrandt's painting are attributed to the subject matter, so the tonal complex of hatching is attributed to the subject matter it depicts, forming a composite surface texture with whatever spreading effects it gives rise to.⁴⁷ Sometimes the effect is odd, as when parts of Washington's face, the nose, the forehead, appear tightly wrapped in a "net" of hatching. But the printmaker has gone to much effort to avoid this effect obtruding, by adapting the size, shape and orientation of their hatching to the texture of the depicted surface, using, in particular, finer marking and, even stippling in depicting Washington's face. But as with painted texture, such an effect is never quite life-like: it is always some composite of the forms and textures established faintly by spreading effects, and the perceived "surplus" of the hatched lines.

Finally, it should be noted that neither experiences of kind (a) or (b) are experiences of transparency. In the former, as I have said, the effect is as of looking through gaps between the hatching – in the case of *The Sudarium*, it is like looking through the gaps *between* the spiral, somewhat like looking through black lace to see a face beyond. The experience is therefore not twofold. In the latter case the hatching is experienced not as part of the picture surface at all, but as imbricated with the subject matter in the virtual space of the pictures. So, much as with the Rembrandt, there is no twofoldness. Nevertheless, both kinds of experience accord with, and are illuminated by, laws of scission.

(vi) Pictures that are physically transparent

⁴⁶ This is on the face of it not implausible, since other subjective effects, such as optical fusion and the scission of transparency perception, maintain luminance.

⁴⁷ My account requires that these spreading effects generate apparent textures that satisfy Watanabe and Cavanagh's conditions for achieving imbrication with the hatched marks. Spreading effects can produce quite effective textural effects (observe Christ's moustache in *The Sudarium*). But perhaps the difficulties of satisfying these conditions account for the "odd" effects I describe, where imbrication is incompletely achieved.

Some pictures, most notably those in certain stained glass windows, are physically transparent. I will avoid the example of stained glass here though, since as in the case of *Adam Delving* it is usually designed so that things are not clearly visible on the other side of it, not least through the use of translucent rather than transparent glass. So take instead a pane of coloured glass, on to which is printed in transparent grey ink a photographic image. One could think of it as a transparent version of the sepia photograph I discussed above. If this glass is set into a window frame, we will be able to see things through it, and perhaps with a little concentration we will be able to maintain a visual awareness of the scene on the other side of the glass, while it continues to function as a picture – that is, while we are also simultaneously aware of the depicted subject matter and the coloured glass. The worry here is how a picture surface can appear transparent as the thesis of this paper holds, when it is already actually transparent and visibly so.⁴⁸

This example can be successfully tackled once one understands that psychological accounts of transparency perception allow for the perception of what we may what I shall call multiple transparency. So, in double transparency, we will perceive two overlapping transparent surfaces, and see through both of them to an opaque surface. In doing so we simultaneously maintain a visual awareness of the two transparent surfaces and the opaque surface (fig. 7). In such cases a more complex scission occurs, the stimulus colour being divided between three surfaces where the three surfaces overlap rather than two.

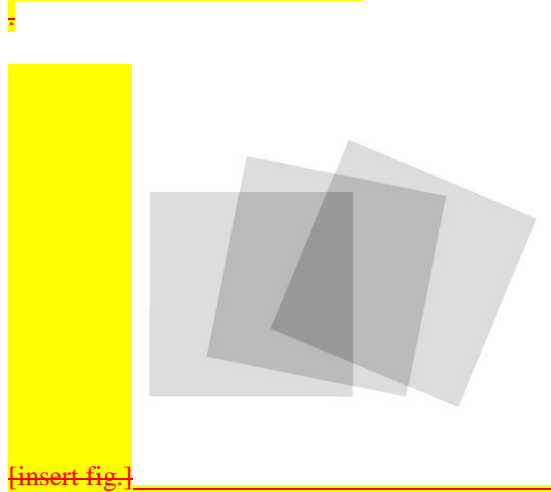


Figure 7. Double transparency

In the case of our example, we remain aware of features of the glass such as its reflective shine and its hue. As with the sepia photograph, we attribute its tonal values to the depicted subject matter. And we see at the same time the scene behind the glass. The subject matter will typically appear behind the glass, and the scene visible through the glass will typically appear behind the subject matter. The glass and

⁴⁸ I am grateful to an anonymous referee for raising this concern.

depicted subject matter will both appear as transparent, and through them both we will see the scene outside.⁴⁹

It is also notable that this pictorial experience, and the visual experience figure 7 occasions, are no longer twofold. They involve experiences in which three (rather than two) visible surfaces appear to overlap without occlusion. That is, they are threefold. One can find further examples of threefold experience involving pictures. I will not analyse them here, but consider for example, a picture of a transparent object (say a coloured glass vase) through which other depicted objects can be seen. Or, in certain circumstances, a picture that depicts another picture: we may be visually aware of the apparently transparent surface of the picture, through which we see the apparently transparent surface of the depicted picture, through which we see the depicted picture's subject matter.⁵⁰

(vii) Pictures depicting subject matter that appears to project from the picture surface

All my examples so far have dealt with subject matter that appears to lie behind the picture surface. But as Wollheim says, subject matter can also appear to project from a picture's surface. How does transparency figure in our experience of such pictures? I have an elegant response to this question. Let me use as an example a chalk drawing by the pavement artist Julian Beever, *Pre-Modernist and Post-Modernist*.⁵¹ [supplementary figure 7] Working on a paved mall, Beever uses anamorphic projection techniques to give the impression that a large rectangle of bricks has been removed from the pavement. The missing bricks are drawn so they appear assembled in a nearby stack, reminiscent of Carl Andre's infamous Minimalist sculpture *Equivalent VIII*. Standing at precisely the right viewpoint the depicted bricks appear to sit atop the surface on which they are in fact drawn, and one might get the uncanny sense that Andre, or some errant council workers, have been labouring here. But though its technique is *trompe l'oeil* in this sense, as a chalk drawing it is unlikely to genuinely "trick the eye". Indeed, as is generally the case with pavement drawings, one can readily discern traces of the pavement beneath the drawing: both the furrows between the pavers, and their rough surface texture remain visible throughout the chalk drawing.

Part of the experience this work occasions is now familiar: where the gap in the pavement is depicted, the actual pavement (that is, the picture surface) appears

⁴⁹ Another possibility, especially if there are objects only just behind the glass, is that these may appear to be in front of the subject matter. My expectation, drawn from analysis in (vii), is that where a physically opaque object seems to lie in front of the subject matter, the opaque object will appear transparent and the subject matter will appear opaque.

⁵⁰ I suppose there must be some limit to how many folds a perception may have (how many panes of overlapping coloured glass can one see through while still maintaining awareness of the individual surfaces?). Still, it seems likely that we can perceive even more "folds" than I have considered here. I thank an anonymous referee for suggesting the possibility of such "multi-fold" perception.

⁵¹ Photographic documentation is on Beever's website (<http://users.skynet.be/J.Beever/postmod.htm>).

transparent. In photographic documentation of the work, one especially remains aware of the furrows in the pavement, which, chalked over for the most part, take on a faint transparent presence through which is seen the sandy space beneath the pavement. It is the other part of the chalk drawing, that depicting the bricks, which provides the answer to my question: here one sees the pavement surface *through* the depicted pile of bricks. The depicted bricks have a ghostly, almost glassy presence through which features of the actual pavement, especially the grid of the furrows between the bricks, remain dimly visible. This phenomenon of transparent subject matter is commonplace in anamorphic chalk drawings, but it has a presence in fine art too. As I have mentioned, the most famous of anamorphoses, the skull in the foreground of Holbein's *The Ambassadors*, appears to float some distance in front of the canvas when viewed from the correct vantage point. So far as one can simultaneously keep in the visual awareness both the depicted skull, and the sleek texture of the paint that depicts it, the skull also takes on this transparent quality. That is, one has the experience of seeing through the skull to the painting's surface. So, my proposal needs a simple adjustment when subject matter appears to project from the picture surface. In these cases, rather than seeing the subject matter through the seemingly transparent picture surface, we see the surface through the seemingly transparent subject matter.

7. Imbrication and inflection

I return now to the experience of imbrication, to clarify the phenomenon, and to show how it relates to a similar concept, inflection, which has attracted attention in the recent philosophical literature on pictures. I have used the term imbrication to indicate the appearance of a picture's subject matter when certain visible features of the picture surface (the texture of brushwork, and visible hatching) are attributed to the surface of the subject matter rather than the picture. As I have said, these features then appear "imbricated" with the features of the subject matter depicted by more conventional means (especially tonal modelling). For clarity, I will discuss only the imbrication of paint texture below, but I expect much the same can be said about imbrication of hatching.

What is the experiential character of imbrication? I have claimed that it is an experience of composite texture, drawing the idea from Watanabe and Cavanagh. But what does such an experience amount to? Watanabe and Cavanagh's work provides less guidance here – their paper implies that experience of composite textures is possible, but they do not give a description of it. So let me venture a description myself. Consider an example: the depiction by a painter of hair. Often a painter will not attempt to depict hairs individually. Instead she follows the general direction of the hair with the brush, giving a texture that gives some suggestion of individual hairs (through the texture left by the bristles of the brush), their length (through the length of brushstrokes) and their shape (which the brushstrokes and bristle marks follow). At the same time, the painter varies the tones of these brushstrokes. Partly this tonal variation models the general volumes that the hair fills, much as other forms are depicted using tone. But it also serves to depict features of the hair's texture: darker tones mark the shadows where locks of hair separate from one another, and lighter tones indicate where the light catches it.

We experience these not as two textures – the actual texture of the paint, and the texture represented by tonal variation – but as a single texture, the texture of the depicted hair. It seems to me that this apparent texture is produced according to the following rule, or one much like it. Consider texture as a raised pattern that is applied to an object's surface. Two such patterns – call these component textures – can be applied one over the top of the other, and the result will be a third texture. I suggest that we experience the composite texture as a single texture that is the outcome of such a process. According to Watanabe and Cavanagh there must be a similarity in size and orientation of the marks for a composite texture to be perceived, so it follows that the experience of the composite will tend to be a strengthened version of its components. That is, a visible multiplication of textural elements will occur, and where individual textural elements overlap, they will appear to fuse and obtrude further. This seems a good account of the experience that the use of texture in painting hair yields. The texture of the paint enriches the texture depicted using tone: more fibres seem visible, and the sense of relief is accentuated.

It will be asked, how does our experience of such a composite texture allow us to distinguish the separate contributions of real texture, and tonal modelling? My account allows that while we apprehend the texture as a single texture, we can recognize aspects of the composite texture as having the texture of paint rather than that of the subject matter. The texture of the brushstrokes needs to satisfy Watanabe and Cavanagh's conditions of orientation and size, but otherwise does not need to be much like the actual texture of the depicted subject for imbrication to occur. So in contributing to the experience of the composite texture, it also retains its visibly brushstroked appearance. That is to say, the subject matter appears to take on textural properties of the paint (an effect that aligns imbrication with inflection, as will be clear below).

Note too, that as I have discussed in section 5, this experience can alternate with a visual awareness of the medium as medium, but in doing so the viewer loses awareness of the subject matter. In this case we see the paint's tonal and textural properties as they in fact are. Together these points allow for a rather richer experience of a painting than might at first be apparent on my account. For instance: if we visually fasten on to a brushstroke, and step back, we can retain the awareness of the brushstroke's texture as our awareness of its association with the surface ebbs, and it appears to become imbricated with the subject matter.

I now look at how this account relates to inflection. Inflection describes the experience of a picture in which a picture's subject matter is inflected with qualities of the medium. For Hopkins, inflection occurs when "what is seen in a surface includes properties a full characterization of which needs to make reference to that surface's design (conceived as such)."⁵² Michael Podro, on whom Hopkins draws, finds an example of this in Veronese's *Unfaithfulness* (c. 1575, National Gallery, London), observing that "the sense of the brush across the heavy weave canvas intimates the

⁵² Robert Hopkins, 'Inflected Pictorial Experience: Its Treatment and Significance', in Catharine Abell and Katerina Bantinaki (eds.), *Philosophical Perspectives on Depiction*, Oxford: Oxford University Press, 2010, p. 158.

physical immanence of the woman's back."⁵³ The woman's skin appears to take on the qualities of the painted surface which inflect the sense of form that Veronese achieves through the more standard means of tonal modelling. On the basis of this, imbrication may seem to be the same thing as inflection, or at least a kind of inflection.⁵⁴

However, Hopkins argues that inflection presents two challenges for what he calls divisive accounts of seeing-in, of which mine is, in a sense, an example.⁵⁵ I will show how my approach escapes these challenges, but first I will need to explain the distinction Hopkins has made between divisive and unitary accounts of seeing-in.⁵⁶ All accounts of seeing-in will make a distinction of content: between the experience of the picture surface and the subject matter seen-in it. However there is a question, as Hopkins puts it, of "whether the distinction between the two dimensions of content in pictorial experience is taken to correspond to any further divide in its nature."⁵⁷ Divisive accounts hold that it does; unitary accounts maintain that it does not. My account is thus a divisive one, in so far as it analyses seeing-in as a matter of being aware of one layer (subject matter) through another (the picture surface), and implies that we could, at least conceivably, have such awarenesses independently of one another. The first problem that inflection presents for divisive accounts is this. Divisive accounts imply that when inflection occurs the picture surface will feature *twice* in our experience of the picture: we will be simultaneously aware of both the picture surface itself, and of the subject matter as inflected with the properties of the picture surface. Hopkins is right to point out that this does not reflect our actual experience of pictures. As he says of a Rembrandt drawing, the "ink strokes do not figure twice over" in our visual awareness.⁵⁸ But as I describe in the previous section, when imbrication occurs, the pictorial experience is onefold. That is, one does not experience the texture as being of the picture surface; instead it is experienced just once, as a feature of the subject matter. Thus my account is not vulnerable to this criticism.

Hopkins' second objection is complex, so let me extract from it that part that challenges my approach. Hopkins writes,

Anything bearing inflected properties is not just an unusual sort of entity, but one that somehow combines aspects drawn from very different orders

⁵³ Michael Podro, *Depiction*, New Haven: Yale University Press, 1998, p. 13. Podro's book features the initial discussion of inflection. It is also discussed by Dominic McIver Lopes, *Sight and Sensibility: Evaluating Pictures*, Oxford: Oxford University Press, 2005, esp. pp. 123–124.

⁵⁴ Podro's and Hopkins' treatments of inflection are not limited to texture; they also extend to the sense of motion brushmarks can have.

⁵⁵ Hopkins, 2010, pp. 171–179. Bence Nanay argues against Hopkins' claim that divisive accounts may not accommodate inflection, though Nanay's approach differs from mine. (Bence Nanay, 'Inflected and Uninflected Experience of Pictures', Catharine Abell and Katerina Bantinaki (eds.), *Philosophical Perspectives on Depiction*, Oxford: Oxford University Press, 2010.)

⁵⁶ Robert Hopkins, 'Inflected Pictorial Experience', pp. 167–171.

⁵⁷ Hopkins, 2010, p. 170.

⁵⁸ Hopkins, 2010, p. 171.

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of reality: the world of design and the world of scenes visible in design. Can Standard Visual Representation offer us *that*? Until we have a satisfactory answer, the divisive account is threatened ...⁵⁹

Hopkins' concern is that it is difficult to see how the two aspects of seeing-in can be combined when a divisive account typically begins (as mine does) by stressing that they are best understood as akin to ordinary face-to-face visual experience, (Standard Visual Representation as Hopkins calls it). But I have addressed this issue above, where I gave an account of the experience of imbrication as the experience of a composite texture. So we have seen already that an understanding of ordinary visual experience does indeed give us the resources to describe the experience of imbrication.

Inflection also raises a question about the significance of my position for the aesthetic value of painting. According to Hopkins, for inflection to hold a significant place in the philosophy of art,

a certain assumption must be made. This is that the task of an aesthetics of pictures is in key part to explain why we value looking at them in ways we do not value seeing objects ... in the flesh. That immediately gives central importance to any contrasts between seeing-in and ordinary seeing.⁶⁰

Consider one of Van Gogh's paintings, *A Pair of Shoes* (1886, Van Gogh Museum Amsterdam) – the old footwear itself is presumably of no aesthetic interest, but the painting is. Why is that? It is not, or not just, that we admire the forms presented by the painting in themselves, as we might those of an abstract painting. Hopkins (*whose takes Van Gogh's painting as his example*) and Lopes points out that inflection seems to give an answer: it is our perception of paint and subject matter in relation to one another – that is to say, it is the way the boots are inflected by Van Gogh's brushwork that we dwell over when we admire the painting. Inflection could then take on the position of central importance Hopkins suggests: it would be the locus of painting's distinctive aesthetic value.⁶¹

This line of thinking presents a challenge for me. As I have described the experience of imbrication, it is reasonable to expect that this phenomenon draws our attention and can provide pleasure. But can it be as important as Hopkins suggests? I am doubtful that it needs to be. In the case of a painting of aesthetically nugatory subject matter, such as Van Gogh's boots, we may expect that imbrication is the sole source of aesthetic pleasure. But we should avoid the temptation to overrate this as a source of value. For example, it is not clear that *A Pair of Boots* gets much of its artistic value from inflection. While it may get all of its aesthetic quality from that source, its primary significance is more likely autobiographical: it is "a memorable piece of his own life, a sacred relic", as art historian Meyer Schapiro put it, rather than an

⁵⁹ Hopkins, 2010, p. 174.

⁶⁰ Hopkins, 2010, p. 165.

⁶¹ Hopkins, 2010, pp. 165–167.; See also Lopes, 2005, p. 192; CHECK????? Dominic McIver Lopes, *Sight and Sensibility: Evaluating Pictures*, Oxford: Oxford University Press, 2005, ch. 1.

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excursion in aesthetics.⁶²

In light of this we might still take inflection to be the source of painting's *distinctive* aesthetic value as an art, even if in some cases it does not contribute greatly to an individual painting's value as art. But this position is also hard to maintain. Consider that much great painting in the Western tradition does not make significant use of inflection. Aside from the work of Venetians such as Titian and Veronese, the painterliness which is a precondition for inflection had little presence in Renaissance and Mannerist painting. It is completely absent in van Eyck, and is seldom to be found in Leonardo and Raphael. Though it is prominent in Baroque artists such as Rembrandt and Velázquez, there is little of it in the work of painters of the period as diverse as Poussin and Caravaggio. It has no significant place in Neoclassical painting, including that of David and Ingres. It is really only since Romanticism that it becomes a dominant feature of painting. So to maintain that inflection is an aesthetically distinctive feature of painting will come at the expense of allowing that much aesthetically significant painting does not take advantage of this "distinctive feature". This sacrifices an element of the claim that I take to be integral to it: that is, that it illuminates the aesthetic value of all artworks that are paintings. Thus, we should not overrate the importance of inflection's contribution to painting's value as an art. Where it contributes aesthetic value, as in the Van Gogh, it may not contribute significantly to the artistic value of the painting. And it does not contribute to the aesthetic value of many of the most aesthetically significant paintings.

8. What seeing-in is

I should first repeat that seeing-in describes fewer instances of pictorial experience than Wollheim thought. Examples where we experience imbrication of subject matter and the marks that depict it are the prime Wollheimian examples of seeing-in that I reject. However, these examples accord with, and are illuminated by, the laws of scission, as are other examples of pictorial experience that Wollheim does not treat, including illusion and *trompe l'oeil*.

Let me now state a clear account of seeing-in in terms of transparency perception. I have argued that seeing X in a surface, Y, involves being visually aware of one of these as being transparent, and seeing the other through it. The experience of Y is never an experience of it as having all the visible properties that are observed when it is seen as surface alone, since seeing-in involves some of these being attributed to the subject matter. Aside from this, the experience of Y is a straightforward notion, since Y is indeed there. More needs to be said about the experience of X. What does it mean to have an experience of an absent object?

Here I want to dispel the suggestion that this experience, qua experience, is different in kind to that of ordinary face-to-face seeing. As I conceive it, there is no necessary qualitative difference between the two. The only essential point of difference for seeing-in is that the visual awareness of X is counterfactually dependent not on the

⁶² For this, see Meyer Schapiro, 'The Still Life as a Personal Object: A Note on Heidegger and van Gogh' (1968), in Meyer Schapiro, *Theory and Philosophy of Art: Style, Artist, and Society: Selected Papers 4*, New York: George Braziller, 1994, p. 141.

presence of X, as it is in veridical seeing, but on the presence of the surface, Y.⁶³ There are other differences, and though these do not occur invariably, they still call for explanation. I identify two here.⁶⁴ The first arises from the fact that we typically do not believe we are in the presence of an object we see-in a picture (though occasionally we may, as when we are tricked by *trompe l'oeil*). The worry here is that the non-veridical experience of seeing may not be compatible with a belief that X is truly present. Reflection on examples of ordinary seeing involving optical illusions show that this should not be a concern. To take one example, a viewer aware of the bent stick illusion can have a non-veridical visual experience of the half-submerged stick as bent, despite simultaneously believing the stick to be straight. Seeing need not always be believing. The second difference is that a seen-in object is often experienced as having different visible properties than would be apparent to the viewer face-to-face with the object. For instance, we do not experience the subject matter in a sepia photograph as having properties of hue (which we would ordinarily see in life), and a caricature provides an experience of its subject matter as having properties (distorted or exaggerated features) that the subject does not have in life. Although these particular experiences may be unique to pictures, examples of ordinary vision do show that these *kinds* of experience – in which objects are visually experienced as having different properties to those normally available face-to-face – are not unique to pictorial experience. In situations where our ability to see is reduced, we typically have visual awareness of things without experiencing them as having their full gamut of usually visible properties. So, in darkness we may not be able to see hues, and in fog we may not see detail. In situations where something (say, a person) we have seen before reappears to us, but with changed properties (say, a new hairstyle, plastic surgery, etc.), we may still experience it as the same object – that is we still recognize it – but we experience it as having new properties.

I thus reject the concern that veridical and non-veridical visual awareness are in some way different in kind at the level of experience. It follows that only the concepts of transparency perception (as a kind of visual awareness) and veridicality are needed to account for seeing-in. That is to say, seeing-in is just a matter of a transparency perception incorporating a veridical visual awareness of a surface, and a non-veridical visual awareness of an absent object, such that the awareness of the object is counterfactually dependent on the presence of the surface.

⁶³ This distinction, including its use of the concept of counterfactual dependence, draws on David Lewis, 'Veridical Hallucination and Prosthetic Vision', in Jonathan Dancy (ed.) *Perceptual Knowledge*, Oxford: Oxford University Press, 1988.

⁶⁴ I discuss these more extensively in [Author publication 2]

Supplementary illustrations



Supplementary figure 1. Luca Signorelli and workshop, *The Assumption of the Virgin with Saints Michael and Benedict*, late 1480s, New York, Metropolitan Museum of Art.



Supplementary figure 2. Cover, Anthony Burgess, *A Clockwork Orange*, London: Penguin, 2000.



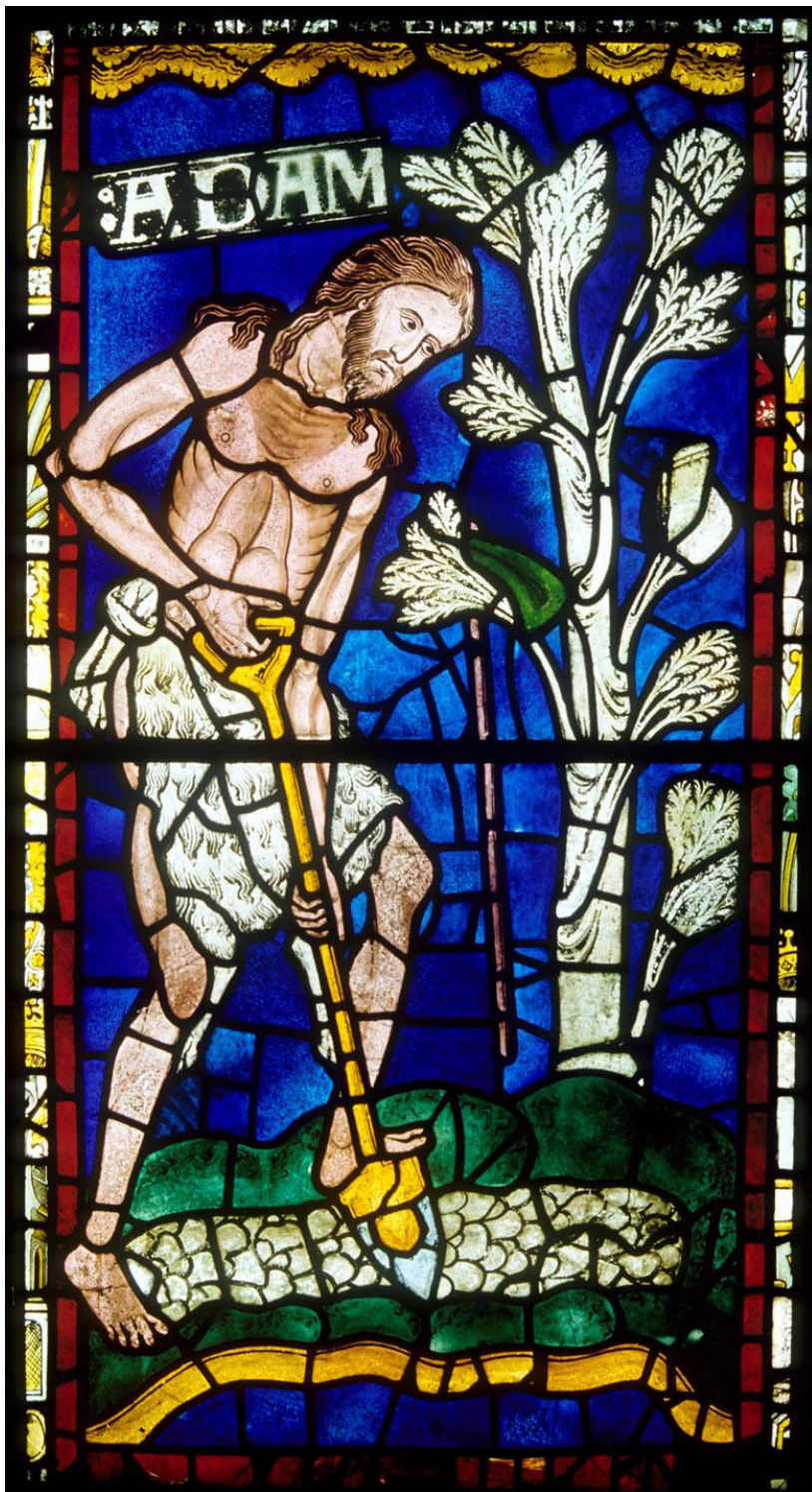
Supplementary figure 3.



Supplementary figure 4. "Oilette" postcard, published by Raphael Tuck & Sons.



Supplementary figure 5. Rembrandt van Rijn, *Self-Portrait as the Apostle Paul*, 1661, Rijksmuseum, Amsterdam.



Supplementary figure 6. *Adam Delving*, stained glass, late 12th century, Canterbury Cathedral.



Supplementary figure 7. Julian Beever, *Pre-Modernist and Post-Modernist*, n.d.