

Macchie, Passages and ‘Edges Lost & Found’

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Abstract

In the visual arts, one often composes a spatially organised array of elements. These elements are often roughly uniform patches (‘macchie’) and edges. These are mutually complementary and often imply each other. ‘Edges’ may either divide or unite macchie, whereas adjacent macchie may imply an edge. Edges may be common boundaries as in cloisonnism, or be one-sided as in outline. Composition often requires that edges be ‘lost’, either to avoid the dreaded silhouette effect, or to merge macchie that are semantically distinct, like figure and ground. This leads to planned ‘passages’ or various modulations of edge quality, the ‘lost & found’ quality being most common. I relate such conventional artistic devices to the concept of ‘edge’ in image processing and human vision.

Keywords

Edges, macchie, boundaries, transitions, passages

‘Edges’, ‘macchie’ and ‘passages’ are major topics considered in technical treatises (Cateura, 1995; Clifton, 1973; Guptill, 1928; Jacobs, 1988; Kandinsky, 1926; Koenderink, 2011; Da Vinci, *ca.* 1540; Ruskin, 1843–1860; Speed, 1917) on painting. One frequently finds such discussions mentioning ‘edge quality’ (see Note 1), and the ‘lost and found’ property of contours (Note 2).

Although the topic is basic to the arts, it will forever remain a fleeting target, changing along with the capricious evolution of the arts. Thus I can do little more than show a glimpse, indeed *show*, for this is not a topic that lends itself very well to linguistic description.

I closely follow my VSAC 2018 (<https://www.vvac2018.eu/>) keynote talk, except where the drift of the talk cannot be captured in writing and static images. I kept the text colloquial, but added references (obviously absent in the

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talk) and some notes. It is not intended as a generic scholarly paper. Due to copyright constraints the figures do not quite reflect the original talk.

So I'll present a short foray into the world of image making. I naturally concentrate on *visual* as distinct from *conceptual* art. As a required formal background I refer to my earlier paper (with several esteemed co-authors) in this journal, *Boundaries, Transitions and Passages* (Koenderink *et al.*, 2016a).

Figure 1 shows the introductory slide of the talk. Notice that this illustrates line, edge, contour and macchie, as well as some possible interrelations. It suggests various topics that I pursue a little more formally in this text.

Coloring books are very popular as a means of relaxation (like yoga, Note 3), but most visual artists go to great lengths to avoid a 'coloring book look'. That would signal the work of a 'Sunday painter'.

Although *cloisonnism* was *en vogue* during the *art nouveaux* period (Fig. 2), painting and design have nothing to do with the coloring book style, but with *macchie-color*, as in the Anquetin painting and with line emphasis and planar composition as in the Witzel graphics.

Outlining more or less uniformly colored areas with a black, or sometimes grey, or even white, fairly thick outline very significantly changes their hue. A black lining gives the colors a precious jewel-like quality, a bit like the effect one sees in church windows in which colored glass panes are held by leaden strips (Note 4; Chevreuil, 1839; Bezold, 1874).

As one may see in Fig. 3, artists do not necessarily 'color within the lines'. Fashion illustrator Chico Hayasaki offsets the painted silhouette with respect to the line drawing so as to achieve a strong feeling of dynamism: the offset introduces a (virtual) dynamic element. Daumier throws a dilute ink wash over his pen drawing that serves to indicate the relief and simultaneously isolates and merges the heads. It is a magnificent professional achievement, fitting in perfectly with his loose linework, looking like it is due to the Force of Nature.

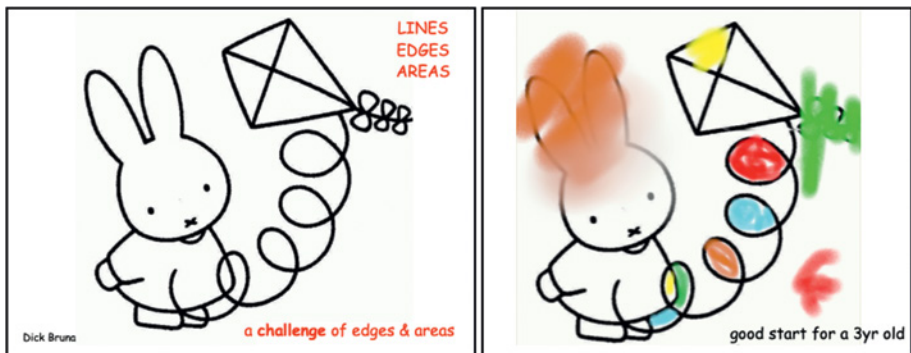


Figure 1. At right I colored a Dick Bruna (1927–2017) *Nijntje* drawing (left) in the style I copied from my grandsons.



Figure 2. Left: Louis Anquetin (1861–1932), *Femme au Bord du Lac*, 1889. Right: Josef Rudolf Witzel (1867–1925), from *Jugend 1897* (vol. 2, 1897).



Figure 3. Left: Chico Hayasaki, contemporary illustrator. Right: Honoré-Victorin Daumier (1808–1879).

Notice the remoteness of Daumier's to Chico Hayasaki's work, which almost looks sterile in comparison. Of course, this is an unreasonable comparison since the works derive from different universes.

An important distinction is between line and *macchia*. In Fig. 4 (top) one has a case of pure line work. These drawings by Saul Steinberg merit careful study. Consider what the lines ‘stand for’, where they are one- or two-sided, whether they change their nature along the way. In contradistinction, in Fig. 4 (bottom) one has compositions of planar patches (*macchie*) of various shapes. Notice that there are still implicit lines, for instance as the edges of the *macchie*. In some cases (Fig. 5) it is not even clear whether the pictorial structure is carried by linear or area-based elements.

Macchie do not necessarily have sharp contours, for instance, reddish cheeks, buttocks, elbows and knees are necessarily diffuse, or they would look like birth marks (Fig. 6). In that, they are like local shapes (dimples, muscular swellings — Bridgman, 1961; Hatton, 1895). They cannot be outlined in coloring book style without introducing a ‘wooden’ look. ‘Gradients’ are pervasive in the visual arts (Ruskin, 1857). Truly ‘flat’ areas are rarely used in painting because they tend to appear ‘dead’. They properly belong to graphic design. Gradients may be said to straddle the gap between edge and *macchia*. That is to say, gradients may be read as either edge or *macchia* according to context and the viewer’s mental set.

Local shapes can and often are indicated by line, but this involves at least pairs of mutually coordinated lines (Koenderink *et al.*, 2012a).

The Italian ‘*macchiaioli*’ (Fig. 7; Boime, 1993; Broude, 1987) might rightly be called pre- or proto-impressionists. Their name might have been derived from the Italian for wild mediterranean bushes (a disparaging term dubbed by a critic in 1862, because they painted *al’aperto*), but it evidently referred to *macchie* too. This implied ‘unfinished’ work. At the time it was to be understood as a pejorative term, although it looks attractive to our modern eyes.

The philosophical notion [Vittorio Imbriani (1840–1886); see Imbriani, 1868] is that the eye grabs images by the largest blobs and that one should not hide that in the kind of detail that is only seen on prolonged scrutiny.

Both lines and *macchie* can be used in numerous, mutually quite distinct ways. Both lines (Fig. 8) and *macchie* may be virtual. John Ruskin’s arc (Ruskin, 1857) is essential to the composition, it is ‘seen’ although not drawn, and all the better for it.

The vertical is a major topic of Jørn Utzon’s drawing, it is both direction of gravity, that is the pull of the earth, and an implicit pointing towards the direction of heaven. Neither has been drawn, at least not by the pencil, but both are drawn in the mind of the viewer.

A line does not necessarily ‘bound’ anything, that is to say, it does not necessarily stand for an edge or a contour. A very different, but common use of line is the so-called ‘line of action’, seen at work in Gretchen Kelly’s one-minute drawings (Fig. 9). The success of such drawing depends fully on the

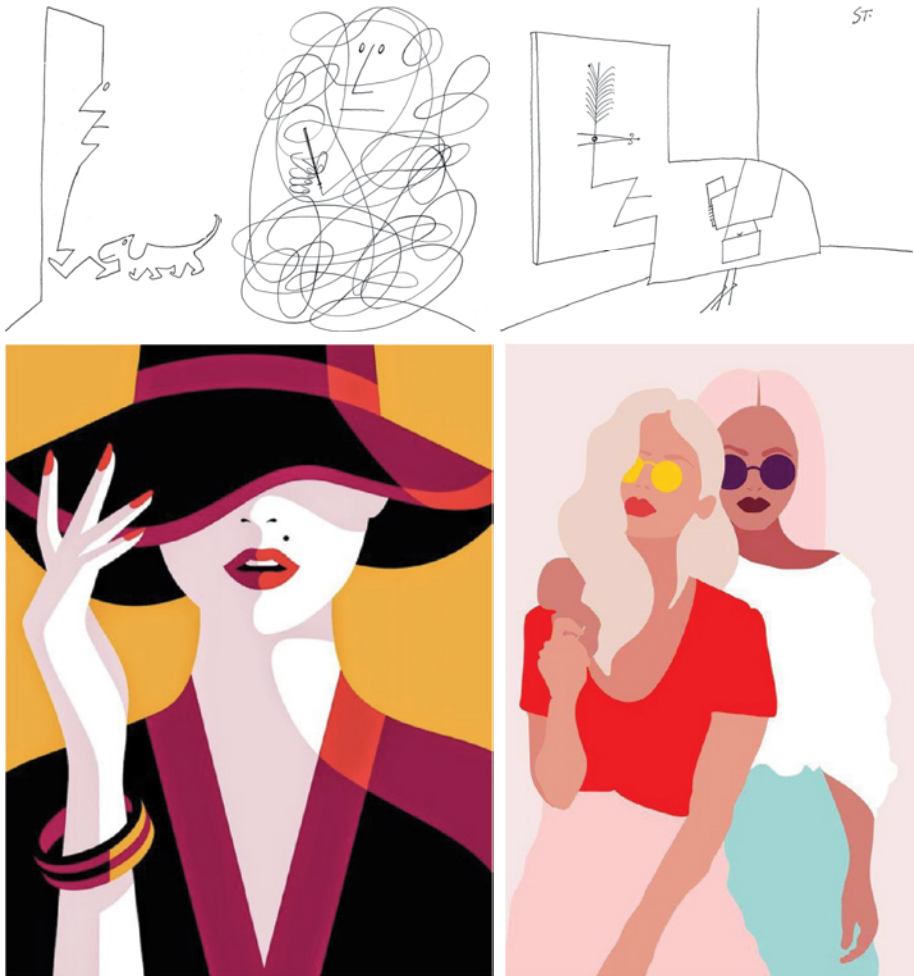


Figure 4. Top: Saul Steinberg (1914–1999). Bottom: Macchie-based compositions (Malika Favre, born 1982, French illustrator; Isabel Castillo Guijarro, Spanish illustrator).

line of action as it is drawn in the first few seconds. The ability to see and draw the dominant line of action defines the professional artist. It takes considerable training in ‘learning to see’ (Koenderink, 2018).

The line of action, even when ‘hidden’ in a final drawing, is the very soul of the work (Fig. 10). If it is not just right, it makes little sense to finish the drawing. Most artists would rather make a fresh start. Even naïve observers who are not aware of technical devices like ‘lines of action’ are sensitive to it. They may notice that a drawing ‘is not quite right’ or ‘misses something’ if

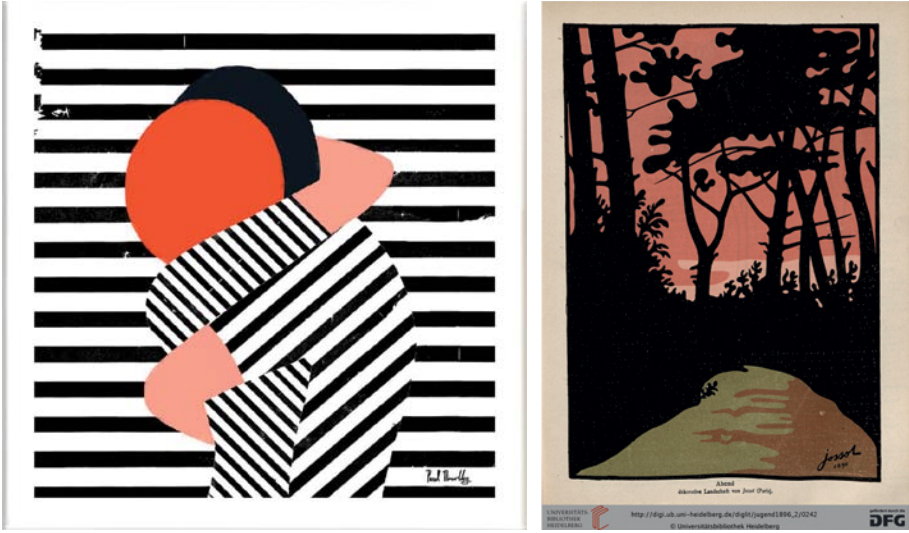


Figure 5. Left: Paul Thurlby, contemporary illustrator. Right: Gustave-Henri Jossot (1866–1951), from *Jugend* 1896.



Figure 6. Left: Jean-Marc Nattier (1685–1766), *Manon Balletti* (1757). Right: François Boucher (1703–1770), *Marie-Louise O'Murphy* (c. 1751).



Figure 7. Left: Giuseppe Abbati (1836–1868), *Chiostro*, 1861. Right: Giovanni Fattori (1825–1908), *Soldati francesi del '59* (1859).



Figure 8. Left: John Ruskin (*Elements of drawing*, Festung Ehrenstein). Right: Jørn Utzon (1918–2008), Danish architect (Utzon, 1962. Platforms and plateaus: Ideas of a Danish architect. *Zodiac*, 10, p. 116).



Figure 9. Gretchen Kelly, One-minute poses.

something is awry. Indeed, what is missing is the life of the pictorial object. Of course, that is a deadly omission (Note 5).

Edges are lines that bound, they come in many types. Dürer's edges describe the shape of the pillow (Fig. 11). The edges are formed by hatching, the direction of the hatching lines being transverse to the edge, thus the edge as such is not drawn. Indeed, that would introduce the coloring book atrocity.

Dürer uses a wide spectrum of edge widths and strengths. This is the 'edge quality' artists often talk about. Edge quality is important in both drawing and painting, though achieved by very different means.

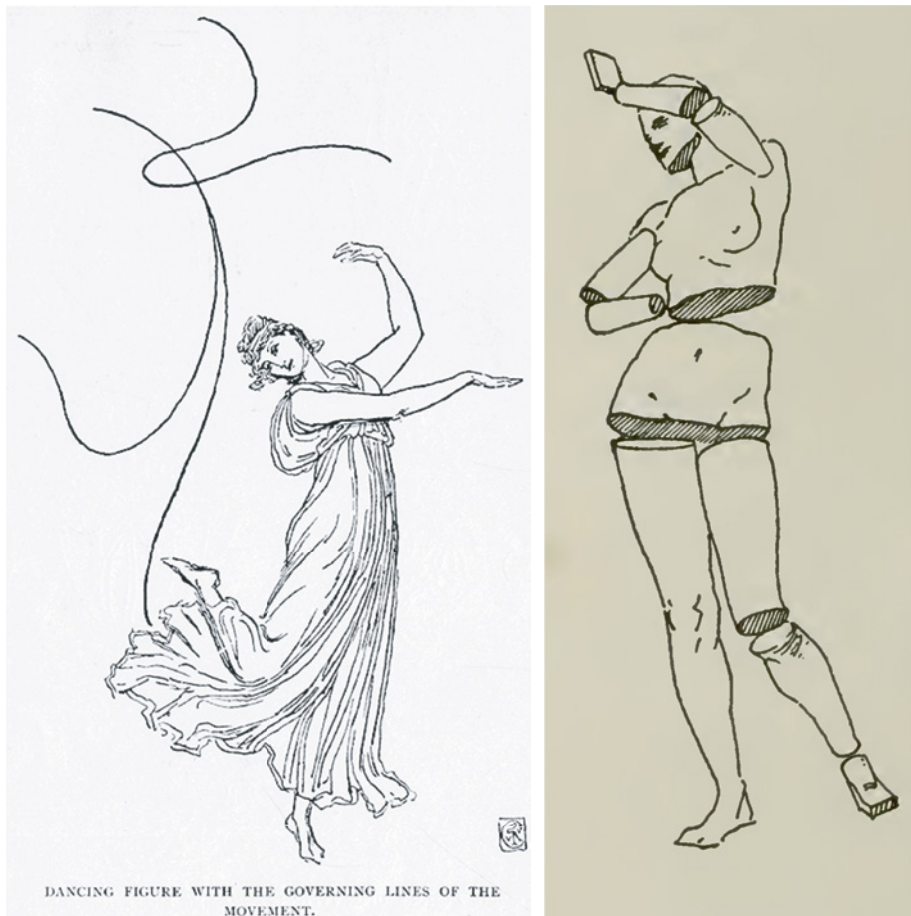


Figure 10. Left: Walter Crane (1900): ‘*The governing lines of the movement*’ (that is the ‘line of action’). Right: Richard Hatton (1895): ‘*The different angles at which the various sections of the body are placed, must be particularly noted, as is illustrated in Fig. 14*’ (that is the line of action again).

Iryna Yermolova (Fig. 12) does that in her nude study. It is especially interesting (and complicated) because the *macchie* and ‘edges’ are expertly used to suggest 3D relief, using a minimum but very effective rendering of shading and highlight (Koenderink *et al.*, 2016b).

Just close one eye and look at the picture for ten seconds, and you will become aware of a strong sense of relief in pictorial depth. Edge quality is so important that many artists make special studies of it. In techniques that do not allow for changes in what has currently been put down, one uses small studies

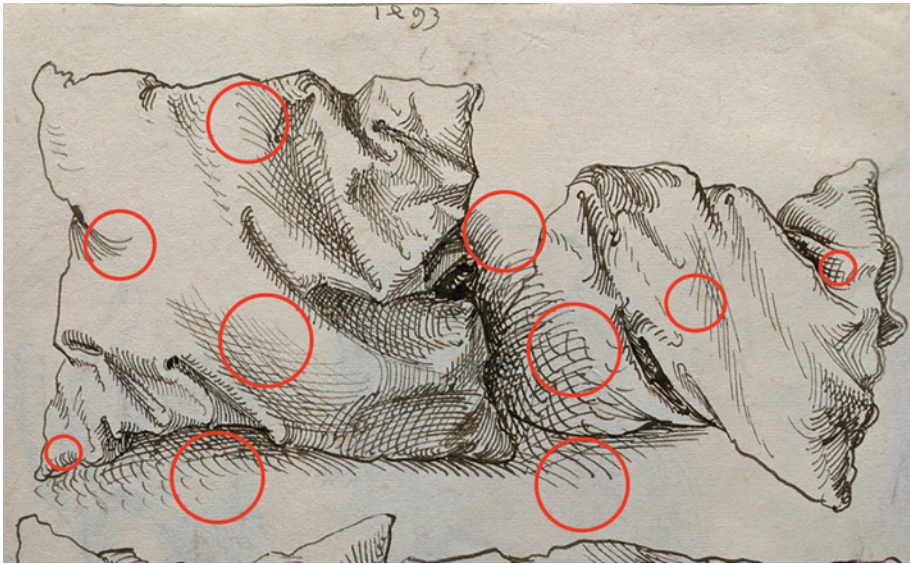


Figure 11. Albrecht Dürer. Some edges are indicated. Notice that the hatches tend to be transverse to the edge.

on the side, or temporary transparent overlays. In techniques like oil one simply overpaints, perhaps scrapes away, perhaps blends wet paints.

Good examples are the drawings of Seurat (Fig. 13). Consider the width and strength of his edges. Also notice how Seurat uses the Craik–O’Brien–Cornsweet illusion (O’Brien, 1959; Ratliff, 1965) to best advantage.

Seurat’s drawings are all about *macchia* and especially about edge. They are wonderful, sensitive achievements by an artist whose finished paintings tend to have something mechanical about them, occasionally reminding one of paste-ups. Seurat’s treatment of edges in the drawings includes, but is in no way exhausted by, Leonardo’s concept of *sfumato*, the ‘smoke-like’ quality of contours.

In painting ‘edges’ need not be painted at all, since they can usually be suggested as relatively undefined and ambiguous transition regions between *macchie*.

Edge quality is just as important in photography as it is in painting, although for somewhat different reasons. One uses contour width, which is malleable through focus/defocus, to indicate depth gradients and to segregate areas (Langford, 1965). Boundary contrast is another important tool. It can be controlled by changing the background, either materially — as in the studio — or through a change of viewpoint, or by manipulating lighting.



Figure 12. Iryna Yermolova, *Nude Sketch II*. Notice ‘passages’ of various types.

Good examples are formal portraits (Kobal, 1987) where the focus almost invariably will be on the eyes, whereas a strong volumetric impression arises from a focus gradient. In an *en face* view one tries to let the tip of the nose be acceptably sharp. This may be hard in low light (thus wide aperture) because one focuses on the eyes. If necessary, a localized highlight will induce an illusion of sharpness (Note 6). Likewise, a slight blur in the hair can often be countered through glints produced by a ‘hair light’ (Nurnberg, 1948; Note 7). A common source of trouble are the ears, which look objectionable when overly blurred. Here the painter is in the advantage, since painterly



Figure 13. George-Pierre Seurat (1859–1891). (You may recognise some details from well-known paintings.)

‘generalizing’ looks much better than standard optical blur. The photographer either lets the hair occlude an ear, or loses the ear in a convenient pool of darkness. In the old days (glass plates, before film) the photographer might even reckon that the then conventional *retouche* would fake some sharpness in the blurred ear by shaving the – then huge – negative with a scalpel. (Shaving off the emulsion removes optical detail and replaces it with indistinct darkness.)

Edge quality in photographs depends critically upon the optics. Whereas properly focussed images due to highly corrected optics all look similar, they may well differ greatly ‘in their unsharpness’, that is to say in the areas that are just out of proper focus. The differences again disappear in strong defocus, for eventually the highly blurred images will become uniformly toned areas. Lenses that ‘draw nicely in their unsharpness’ are highly sought after by artistically inclined photographers. They tend to be the lenses of the older, fairly simple designs. The modern, complicated designs often have a much superior quality in focus, but frequently unpleasant ‘spurious resolution’ (like doubled edges) in the slightly defocussed areas.

Such effects are especially noticeable in movies, when the focus is dynamically changed from one distance to another, as is common in shots of two-actor confrontations. Here one has a good opportunity to judge the good taste of the cameraman.

A very different way to handle photographic edge quality is through the intentional use of spherical aberration (an official ‘design flaw’!) of ‘soft-focus’ lenses (Russell Young, III, 2008). This effect is very different from regular defocus, thus soft-focus should not be confused with defocus, or defocus blur. Unfortunately, nowadays even many professionals tend to be clueless as to the difference. With special (much sought after) optics one obtains sharp edges surrounded by a hazy halo. This works especially well for well-localized, bright areas, like glints on dark hair. Soft-focus tends to be limited to female models as skin texture is minimized (keeping the eyes ‘sharp’), whereas skin texture tends to be stressed in male portraits where it is felt to reveal ‘character’. Of course, these effects critically interact with the (often somewhat involved) lighting and background (independently lighted) and require considerable expertise to pull off right.

As to be expected, such optical effects were copied by artists in their paintings. It is often visually obvious whether the artist drew significantly on photographic evidence. Of course, this is nothing new. The effect of the spherical aberration of lenses can readily be spotted in Vermeer’s paintings if you have some experience with imaging optics (Note 8).

Contours may be completely ‘lost’, no edges being drawn at all (Koenderink *et al.*, 2018a). Félix Vallotton was a well-known specialist in this black magic (Fig. 14, left), notice that the right-hand contour of the man is fully lost



Figure 14. Left: Félix Vallotton (1865–1925), Swiss painter working in Paris, associated with Les Nabis. Right: Coles Phillips (1880–1927), American illustrator.

in the black background. Most viewers ‘see’ it as present and well-articulated (Koenderink *et al.*, 2018a), although at idiosyncratic locations.

This is different in Coles Phillips’ case (Fig. 14. right), where the edge of the blue dress is perfectly located and ‘present’ for all viewers. Phillips was famous for his ‘vanishing girls’.

Even more common than lost contours are the *passages*. A typical example is shown in Fig. 15 (left). Bougureau uses passages in the whites and the blacks, so the shirts and the skirts of the girls merge into large macchie (see composition sketch, Fig. 15, right). Notice how the passages are an important means to merge macchie so as to arrive at a suitably simplified composition.

Compositions are either simple or become textures, which is why painters are always looking for opportunities to introduce passages and/or lost edges. If necessary they will invent arbitrary shading or background material to serve their purpose. If the composition ‘works’ it will look ‘natural’ anyway, one easily gets away with that. Moreover, they know very well that spectators find pleasure in the solution of ambiguity (Muth and Carbon, 2013; Muth *et al.*, 2017).

In order to be able to see such things it is necessary to analyse paintings by making highly simplified composition sketches (only the major light and dark macchie), as in Fig. 15. It is another aspect of learning to look (Koenderink, 2018).

Vuillard’s painting (Fig. 16) serves to illustrate that *painting is about painting*. This was perhaps first explicitly stated by Les Nabis, with Maurice Denis’ (1890) famous dictum:



Figure 15. Left: William-Adolphe Bougureau (1825–1905); Right: A composition sketch, in this case computed from the painting by blurring and thresholding. More typically you would make quick, small sketches, while looking at the scene through your eyelashes.

“Remember that a painting — before being a battle horse, a nude woman, or some anecdote — is essentially a flat surface covered with colors, assembled in a certain order.”

The major eye catcher of the Vuillard painting is the huge blue macchia, perhaps the least eye catching are the women’s faces, although these are ‘the’ topic of the painting regarded as illustration.

Once on this path, you concentrate both (or even almost completely) on the picture surface and on the pictorial world. This offers new possibilities, like in chromoluminarism (Signac, 1899) the chromatic dimensions (Koenderink *et al.*, 2017a, 2018b). Pointillism also enables entirely novel ways to construct edges and macchie from uniform textures of spots of paint.



Figure 16. Jean-Éduard Vuillard (1868–1940).

The pointillist texture often leaves the raw canvas visible, a very strong cue to the flatness of the picture plane as a physical surface. Similar effects are easy to achieve in pen drawings by using a stippling technique.

There are many other ways to achieve similar effects, for instance, by breaking up the pictorial surfaces through rough marks in the picture plane achieved by applying partially unmixed paints with a palette knife (Fig. 17).

One perspective on the evolution of the visual arts from the late 19th throughout the early 20th c. is as *the conquest of the picture plane*.

Entirely novel methods were constructed, as in early cubism (Fig. 18, left). Here edges, macchie and elements of pictorial relief are merged in novel ways.

Picasso's girl with mandolin (Fig. 18, left) merges with the background, but without the need of classical passages. To merge the foreground material with the background serves to stress the picture plane without dissolving the pictorial content into mere texture.

Compare this with Ingres' *La Source*, essentially the same topic (Fig. 18, right). Here you can feel your way *behind the figure*, it is in front of the background. Such pictorial space belies the picture plane.



Figure 17. Sally Shisler, a contemporary American ‘post-impressionism’ painter.

Perhaps surprisingly, although merged with the background, Picasso’s *Girl with Mandolin* is by no means ‘flat’. The figure appears in considerable pictorial relief, just like Ingres’ *La Source*, albeit in a completely different mode.

Lines, edges and macchie are used in entirely different ways in graphical design and the classical visual art (pictorial painting, or drawing). Picasso explored the (then) no man’s land in between in his reduction linocuts of the early sixties (Fig. 19). These are of staggering complexity and evidently go beyond my present topic. Especially the interactions between the colors of lines, macchie and shapes (Pinna *et al.*, 2001, 2003, 2018) are fascinating.

Many alternative ways to deal with the interaction between pictorial space and the picture plane have been invented, many depending on unconventional uses of classical ingredients like lines, edges, macchie, shading and so forth.

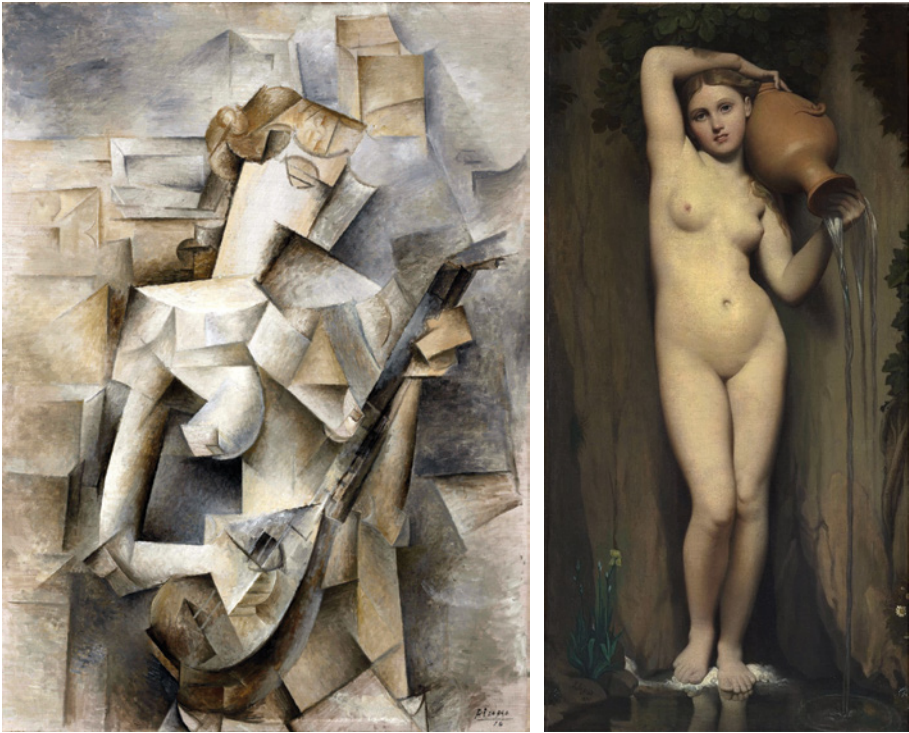


Figure 18. Left: Pablo Picasso (1881–1973), *Girl with Mandolin* (1910). Right: Jean-Auguste-Dominique Ingres (1780–1867), *La Source* (1856).

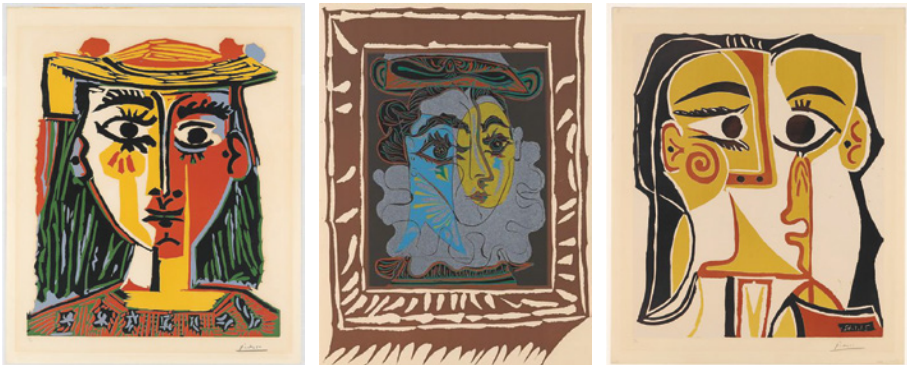


Figure 19. Picasso, reduction linocuts 1962/3 (Metropolitan, New York, USA).

I'll mention just one example of this general class, Kazuki Takamatsu's gouache paintings (Fig. 20), mostly of little girls and intentionally done in an attractive, although perhaps somewhat doubtful taste.



Figure 20. Kazuki Takamatsu was born in 1978 in Sendai, Japan. The edges between successive gray levels are contour lines of equal depth. These are ‘depth maps’.

The technique uses discretised depth maps, using tone to indicate depth. This used to be an exercise in academic art schools (Bammes, 1977), seeing pictorial relief in the manner described by Adolf von Hildebrand (Hildebrand, 1893) and practised by Michelangelo.

The discretisation generates nested *macchie* and interesting contour lines (edges). The results stress both planarity (rather than the physical picture plane) and pictorial depth, which makes for a titillating tension.

Since *painting is about painting* the visual arts are an open-ended foray into uncharted regions. In learning to see (Koenderink, 2018) one soon notices that the same goes for vision *per se*. This is an aspect that was extensively described by John Ruskin (Ruskin, 1857) as ‘mystery’. Mystery (Koenderink, 1984; Koenderink *et al.*, 2012b, 2017b; Muth and Carbon, 2013; Muth *et al.*, 2017) is thus an important topic in painting, more important than battle horses, nude women or anecdotes, and even more important than the picture plane.

Consider the paintings by Francesco Michetti (Fig. 21) and Jean Honoré Fragonard (Fig. 22). Both were primarily ‘genre painters’, but they well understood John Ruskin’s mystery. A small region of the Michetti painting looks like a modern abstract work, whereas in the Fragonard it is impossible to count the cherubs in the background.

Notice that various aspects of my childish coloring of the Nijntje drawing (Fig. 1, right) are part of the technique of drawing or painting mystery. Compare it to the generic structure of stimuli used in vision research or techniques used in image processing or computer vision. All these reveal a hidden reliance on a coloring-book type of optical structure — as filled in by patient adults instead of children.

The technical terms used in these disciplines reflect these implicit convictions. One speaks of ‘edge finders’, ‘edge detection’ and so forth (Koenderink and van Doorn, 2018; Savant, 2014) as if there actually existed such things as



Figure 21. Francesco Paolo Michetti (1851–1929), well known for his genre paintings (shepherdesses).



Figure 22. Jean Honoré Fragonard (1780–1850), *Naissance de Vénus*. Fragonard is well known for his genre painting and barely hidden eroticism.

edges. Yet there are no such things as edges except when you construct them (Koenderink, 2015). In Fig. 23 I show some typical results. For even better results one might hand-select the ‘real’ edges.

The upshot is that edge finders do not *find* edges, but *define* them. That is part of the meaning of the dictum that *painting is about painting*. It is a far



Figure 23. Left: Here I ran the ‘Canny edge detector’ on part of the Boucher painting (Fig. 6, right). Centre: Here I increased the threshold by a factor of three in order to skip ‘weak edges’ (there is an edge — often ‘weak’ — at any pixel for zero threshold!). Right: Here I increased the scale from one pixel to four (threshold the same as in the left-hand picture). You don’t ‘find’ edges as much as you define them by tweaking parameters.

deeper truth than might appear at first glance. In effect, it goes a long way towards a definition of ‘painting’.

Again, *painting is about painting* (Fig. 24). A painting is completely unlike a scene in front of you, or the scene in front of the painter at some moment in the past — if any. In a painting everything is constructed. The painter has constructed something that the mind can manage because it constructed it, whereas physical scenes can never be ‘owned’ by even the greatest minds. This is Giambattista Vico’s (1668–1744) principle of truth: *Verum Factum* (Vico, 1744). Truth is what we make ourselves. There is no truth in Nature. For the visual arts, Nature is chaos, the *hylē*, it is the artist who imposes significant shape, the *morphē* (Williford, 2013).

Painting (or the arts in general) are important because they let us ‘own’ the world, much in the same sense as language does, or the sciences do. However, any such mode has its own rules and semantics. Conrad Fiedler (1887) was the first to explicitly discuss this topic. His understanding is still highly relevant today.

In the arts, unlike language, one does not work with concepts, but with metaphors and symbols. The painter’s edges, *macchie* and the like are intentional symbols by which one grasps aspects of reality. Thus the painter’s edge is a living presence, unlike the output of the scientist’s edge finder, which is a mere ‘pointer reading’, depending for its meaning on the interpretation in terms of some conceptual system.



Figure 24. Painting is about painting! Notice in what sequence Frank Johnston (1888–1949, Canadian artist associated with the *Group of Seven*) painted this scene, the blue sky ‘in front of’ the trees. This is entirely typical. Painting the trees over the sky makes them look like paper cutouts pasted on blue paper. Only the ‘Sunday painter’ would do it that way, a dead giveaway! The apparently inverted layering adds some ‘spice’ to the image and reveals the painting for what it is: not a landscape, but a painting.

Acknowledgements

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Notes

1. Try *edge quality painting* in Google search. In this text I do not offer information on particular artists. If you are unfamiliar with a particular artist, use Google search on *first name, family name, painter* (where the final word could be *artist, photographer, ...*). Style names (*cloisonnism, chromoluminarism, ...*) or artist groups (*Les Nabis, Macchiaioli, ...*) work too.
2. Try ‘*lost and found*’ *edges painting* in Google search. Remember that word order is ignored in Google search, except when a string of words is quoted.
3. Try ‘*coloring books*’ in Google search.
4. An outline affects the colour of the macchia, an effect known as ‘assimilation’ (Bezold, 1874; Fig. 25). A white outline moves the colour towards a

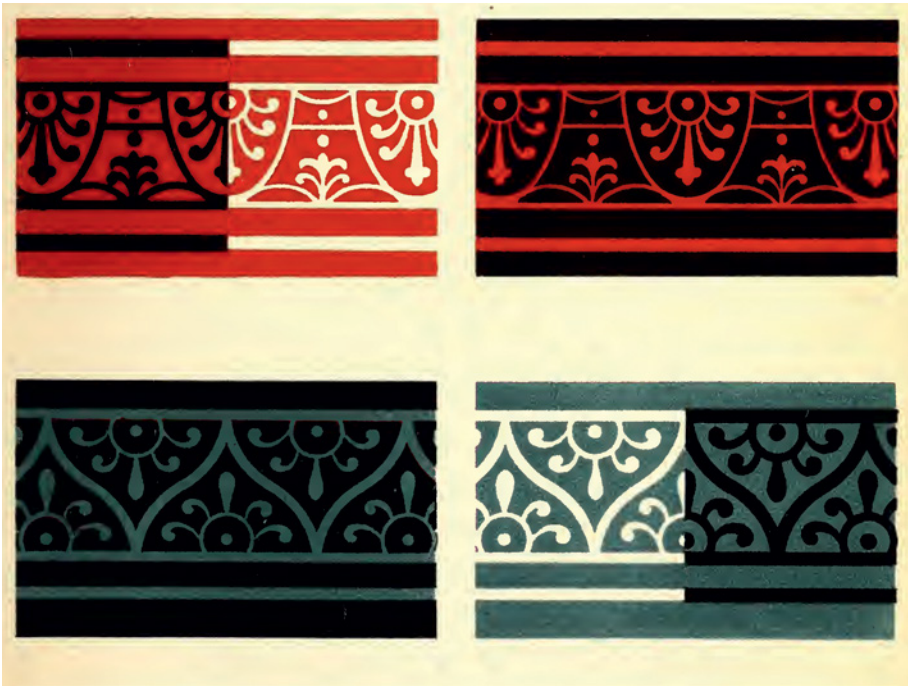


Figure 25. An illustration from Wilhelm von Bezold, 1874, showing the effect of ‘assimilation’ on ornamental borders as used in the graphics design of the time.

‘tint’, a black outline moves it towards a ‘shade.’ Tints tend to appear material, or superficial, because opaque due to multiple scattering. They tend to look milky, like pastels. In contradistinction, shades tend to look ethereal or ‘deep’, because transparent but luminous due to single scattering or a light background. They tend to look like a deep blue sky, tinted glass, or jewels.

5. Intuitively, the notion of the ‘line of action’ must be almost as old as the notion of visual art itself. It is certainly contained in the familiar device of *contrapposto* (as in the Polykleitos *Doryphoros*) (Clark, 1956) and in the mannerist *figura serpentinata* described in Lomazzo’s treatise on the art of painting (see Maurer, 2001; Summers, 1972). There are varieties of the ‘line of action’ approach that may apply to two- or three-dimensional works and may lean towards the ornamental arabesque [think of William Hogarth’s (1753) ‘line of beauty’)], emphatic or dynamic form, or movement.
6. Anything point-like in an otherwise featureless region will make that region look ‘sharp’, even if actually perhaps slightly out of focus. In the days of film photography the emulsion grain had that effect. Tri-X prints of the sixties tend to look sharper than the digital prints of today, although

- the opposite is the case. A local highlight is often ‘sharp’ (actually clipped through overexposure) and serves well to render a slightly out of focus nose ‘sharp’. Painters easily do the same by applying a local white dot of paint.
7. Nowadays ‘kicker’ is often used instead of ‘hair light’ (see <https://www.slr-lounge.com/glossary/kicker-light-definition/>). The term probably blew over from cinematography.
 8. That Vermeer may have used optics has been suggested often enough (Delsaute, 1998; Snyder, 2016; Wheelock, 1977). The criterion is usually perspective. However, the nature of the image, especially the effect of defocus and under-corrected spherical aberration has also been noticed. Art historians usually speak of *halation* (‘overglow’), which is something essentially different, although it looks similar. Vermeer may conceivably have known about optics (both theoretically and practically). His compatriots Antonie van Leeuwenhoek (merchant and microscopist) and Baruch Spinoza (lens grinder and philosopher) were born in the same year (1632) as the painter, Christiaan Huygens (physicist, astronomer and mathematician) three years earlier. The first treatment on spherical aberration is due to Huygens (1690). Historical evidence remains ambiguous and fragmentary, but the evidence of the eye (if you’re schooled in optics) is compelling.

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