THE INVENTION OF THE MYTH OF TOTAL PHOTOGRAPHY

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Abstract

In the mid-twentieth-century, it was widely believed that innovations in photographing movement, colour, and depth would one day afford complete mastery of the simulation of visual perception. This collective representation of purpose and of progress in photography was eloquently expressed as the "myth of total cinema" by André Bazin (1946), who argued that the longing for "integral realism" had always marked mechanical reproduction, inspiring inventors since the nineteenth century. This assumption remains common today.

The present article historicises the integral-image utopia, mapping the expression of its intellectual mechanisms in the first accounts of photography then in photography's emerging historiography. This research reveals the absence of a shared project around "complete" perceptual realism for most of the nineteenth century. The idea of progress toward a total image reproducing vision emerged and came to prevail in the popular imagination at a very particular moment – in 1896, following the invention of cinema – transforming how people thought about the future of photography and told the story of its past.

Keywords: *historiography of photography, technological progress, perceptual realism, animated photography, stereoscopy, colour photography, cinema.*

The drawing in Figure 1 was included in a 1950s brochure promoting a projection system for stereoscopic cinema that offered a three-dimensional image without the use of special glasses. Although simplistic in many respects, this illustration evokes the salient characteristics of the photographic image of the future, as envisioned at the time: a picture that was animated – signified in the drawing by a projected image and a bumblebee; in colour – conveyed with a bright chromatic palette; in three dimensions – represented by the use of perspective; and, of course, accompanied by sound – also conveyed by the bee. This picture would envelop the spectator as it came out of the screen into the theatre space, appearing as natural as an insect buzzing around a dandelion on a sunny day.

The idea that photography had the potential to reproduce the world as we see it can be described as an integral-image utopia: an idealised conception of the photographic image sustained by the sentiment that innovations in the transcription of the action of light were tending towards a complete simulation of everyday perception – even though the most recent technologies, like the one advertised in Figure 1, didn't yet allow seamlessly immersive representation. In the mid–twentieth century, inventors and the general public alike assumed that technological progress in photography was leading in this direction. Ever-greater perceptual realism – or simulation of human vision – was the future.

In histories of the individual illusions that were the basis for the integral-image utopia – colour photography, animated imagery, and stereoscopy – it is commonly assumed that naturalistic realism was a project, or a defined teleological goal, for the photographic image. It is true that these topics were explored during the first decades of photography (although some earlier than others). As is often underlined, some inventors even proposed ways of combining illusions. But the idea that stereoscopy, colour photography, and animated effects were all first and foremost about mastering naturalism, that a "complete" image might be formed using this particular trio of illusions, and that this was photography of the future, came to be widely held much later. Describing the mechanisms of this collective representation of the 1940s then questioning their expression around the public announcement of photography in 1839 and in successive historical accounts of the medium will allow me to demonstrate that an integral-image utopia did not guide early photography, nor did it take shape gradually. Although the nature of the photographic image provided it

with the necessary foundations, this "myth" of photographic purpose and progress formed quite suddenly, around the turn of the twentieth century.

The integral-image utopia

In the 1920s and 1930s, a succession of innovations in cinematography fostered the integral-image utopia (Timby, 2015, pp. 125–132). Cinematography was understood as being photography to which an illusion of animation had been added, and so when "talking" then colour films became common in the 1920s, they were thought of as bringing further elements – life-like sound and mechanically recorded chromatic detail – to this already augmented photographic image. Both in public perception and in historiographical discourse, once sound and colour had become established, stereoscopic depth appeared to be the next and final step in creating an image that was unfailing in its rendition of everyday visual experience. Previously just a spectacular effect in its own right, the third dimension came to be thought of as something that was *missing*.

In this collective representation of progress in photography, the visual illusions of animation, colour, and depth went together with sound, and the presence of some of these elements made the others seem absent. For example, when the French historian Pierre Hémardinquer wrote a history of sound in the movies in 1935 he referred to recent research by Louis Lumière on anaglyphic cinema, declaring: "integral cinema – with sound, in 3D, and in colour – no longer seems utopian!" (p. 6). In his history of colour cinema, of which three editions were published between 1936 and 1951, Adrian

Cornwell-Clyne (1951) declared that the presence of either sound or stereoscopy in movies made colour essential: "the extreme realism of the sound representation conflicted with the entirely artificial nature" of black and white, he argued (p. xii, preface to the 1939 edition). Similarly, in 3D "[s]olid human figures in grey become ghostly dummies. It follows that the mind expects the image to be coloured as soon as it is perceived as a solid in full projection" (p. 614). What I have called an integral-image utopia thus formed conceptually as specialists and the general public alike came to believe that different illusions should go together and that progress was leading towards "total" perceptual realism.

In surveys of the history of photography written in the 1940s, the structure of the chapters, the choice of technologies discussed, and declarations about connections between different illusions were influenced by a belief in the future of an integral image. This became evident to me in studying the reception of stereoscopic lenticular photography. Surprisingly, considering how marginal it is for historians today, the lenticular process was included in French histories of photography written in the 1940s (Lécuyer, 1945; Prinet, 1945; Simonet, 1947). Its elevated status at the time was due to the fact that it was seen as part of history in the making – a step towards the image of the future. Each historian presented stereoscopic depth as part of a trio of naturalistic illusions (along with animation and colour) and presented the lenticular process as the most recent stereoscopic technology. Because lenticular photography rendered depth without the use of a separate viewing device, it was conducive to imagining how movies might integrate the third dimension as seamlessly as they did animation and colour.

A "total" image was conceptualised as one providing a complete reproduction of the world as we see it. In his history of photography and cinema, Simonet (1947) explained that talking films were the norm and that colour was becoming common, yet without 3D, movies still weren't "the strict reproduction of what the spectator would have seen if he had been at the filming" (p. 161). For Eugène Estanave (1930), an early defender of lenticular photography, combining colour, stereoscopy, and animation would contribute to solving what he termed the "general problem of photography": "to represent, via images, objects as we see them" (p. 1). This idea of reproducing vision went back to the origins of lenticular photography. For Gabriel Lippmann (1908), inventor of the theory of the lenticular screen, the process would provide an image that was like looking out of a window. "The most perfect photograph existing today only shows one aspect of reality […]. Direct vision of reality, as we know, offers infinitely more variety. We see objects in space, life-sized, and in three dimensions, not on a flat plane. And their aspect changes with the viewer's position" (p. 446). Citing vision as a model for photography was inherent to the integral-image utopia that culminated in the 1940s.

The integral image of the future, as imagined in the 1940s, would go even further than Lippmann's dream of looking out through a window, however. An essay on the future of cinema by novelist René Barjavel (1944) – revealingly titled *Cinéma total* – described what was now envisioned. Barjavel structured his text around chapters on sound, colour, and 3D, including a discussion of lenticular photography. One day, he prophesised, the image would be transmitted via waves and "materialized

without a screen" (pp. 51–52). The image and our surroundings would no longer be separate:

> In homes, total cinema, at first imprisoned by the receiver and its screen, will break free and roam the apartment. The well-fed middle-class viewer, snug in his armchair, will project the virtual image at his feet, on the carpet, or on the finite space of the tabletop, or somewhere in the space between the floor and the ceiling. A spin of the knob too far, or on a whim of the set, and the image will go through the wall and roam the neighbour's place (p. 63).

The ultimate complete image was an immersive simulation of vision, one that came toward and even surrounded the spectator.

The strength of the integral-image utopia as a collective representation of progress in the 1940s is undeniable. This conviction decisively shaped thinking about the future but also about the history of photography and the ambitions of those who fashioned it. Mid-century, it was assumed that the integral image had always been an objective. One of the most explicit manifestations of how the integral-image utopia reconfigured understanding of the past is cinema critic André Bazin's conception of what he called the "myth of total cinema". For Bazin (1946/2005), the "inventors" of cinema were motivated by the "preconceived idea" of a "total" image. "The cinema is an idealistic phenomenon," he wrote. "The concept men had of it existed so to speak fully armed in their minds, as if in some platonic heaven" (p. 17). For Bazin:[1]

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1)   Bazin presented his essay as a commentary on the just-published first volume of George Sadoul's 1946 *Histoire générale du cinéma*. On Bazin's essay and its relationship to Sadoul's work, see Gunning (2011).

The guiding myth, then, inspiring the invention of cinema, is the accomplishment of that which dominated in a more or less vague fashion all the techniques of the mechanical reproduction of reality in the nineteenth century, from photography to the phonograph, namely an integral realism, a recreation of the world in its own image [...] (p. 21).

In defence of his argument, Bazin cited examples of nineteenth-century inventors who had sought to combine different illusions. It is undeniable that such research existed, and I have also given examples of it along with others (Mannoni, 2000a, 2000b; Timby, 2005), but it does not constitute proof that belief in the *future* of total perceptual realism dates back to the invention of photography. The integral-image utopia was not prophesised in the nineteenth century. It did not guide conceptions of progress from the very start of photography, federating research efforts by providing a sense of common purpose. This collective representation took shape much later than might be expected, with the invention of cinema playing the decisive role.

To evaluate the historical expression (or non-expression) of the concept of the integral-image utopia, it is useful to define its key characteristics and mechanisms in the 1940s. This makes it possible to question the presence of certain ideas about realism and progress in addition to analysing the history of individual illusions. The first, most evident characteristic of the integral-image utopia was *the idea of a complete image*: if photography was convincingly associated with a group of core illusions, the thinking went, it would provide an "integral" or "total" reproduction. This idea went hand in hand with a

fundamental mechanism: *a raising of expectations prompted by changes in the balance of perceptual realism*. When new technologies made one aspect of an image radically more life-like, viewers perceived others as blatantly missing; a sense of absence focused attention on augmenting naturalistic realism further. *Comparison to vision* was essential to the integral-image utopia as well: a complete image was one that fully reproduced the world as we see it. And lastly, the integral-image utopia involved *looking toward the future*. Innovation appeared to be leading towards mastery of perceptual realism, and it was widely believed that this was the direction of "progress" and a likely reality for the photographic image of tomorrow.

In the nineteenth century, these four mechanisms of the integral-image utopia – the idea of a complete image, a raising of expectations by new technologies, conceiving of vision as a model for improving photography, and belief in the future of increased perceptual realism – were not as easily discernable as the examples of combining illusions that are commonly cited as evidence of an integral-image utopia. By looking at when and how these mechanisms started functioning, we can better understand the historical specificity of this collective representation.

Conceiving of completeness and absence in early photography

If the integral image, or total cinema, was indeed a preconceived objective, as Bazin asserts, then in the very first years of photography's public existence one would expect to see an acute expression of the idea of a potentially more complete image. The absence of colour – one of the illusions that would

later form the integral-image utopia – was indeed frequently noted in descriptions of the first photographs, but it was not associated with animation and depth like in the twentieth century. And although the principle of photography and its novel exactitude created a desire for an image that did not lack certain elements, photographs were seen as images that rendered the world in a novel way rather than as destined to reproduce the actual experience of vision.

Around the time of its invention, photography was often summed up as a way to record the image projected in the camera obscura, and the process was widely thought of as nature reproducing itself (Batchen, 1997; Brunet, 2000). Yet, it was remarked, the chromatic detail of nature was blatantly and systematically *not* recorded. For François Arago (1839), Daguerre had "discovered special screens on which the optical image left a perfect imprint" and "it would not be an exaggeration to say that the inventor had discovered a way to *fix the images*, if his method retained colours" (p. 4). For the Swiss artist Rodolphe Töpffer (1841), "when Mr. Daguerre manages to fix colours, just as he has fixed light and shadow" he will have "made portable the reflection in a mirror" (pp. 7–8). Based on numerous early accounts of photography,[2] only one other element was widely considered to be absent from the image: things that had moved. Observations abounded to the effect that "Nature in motion cannot reproduce herself" (Gaucheraud, 1839, p. 17) or "Vacillating objects make indistinct pictures" (Robison, 1839, p. 157) – as in the famous view of the busy boulevard du Temple by Daguerre, in which an almost-stationary boot-cleaner and his client were the only moving elements to have left an imprint (Fig. 2). For

the viewer of the first daguerreotypes, however, the absence of "nature in motion" was not about reproducing an illusion of animation but about accurately transcribing things that were not perfectly still – people, especially, or "the agitated foliage, the running stream, the flying clouds," which "all destroy the picture in which they occur" ([Brewster],[3] 1843, p. 318). While colour easily matches with components of the twentieth-century total image, the difficulty recording moving objects does not. Nor was there any mention, however fanciful, of reproducing animation in the first commentaries on photography. Even depth seemed palpable when optics and chemistry had been sufficiently mastered. For one observer of daguerreotypes, the combination of "true geometrical perspective" and "aerial perspective" gave "a depth – a third dimension – to the picture, which it is scarcely possible to conceive without actually seeing it" ([Brewster], 1843, p. 318). From the very invention of photography, therefore, viewers expressed the idea that it was incomplete – a marker of the integral-image utopia – but the criteria were not the same, with colour the only illusion of the integral-image trio discussed. The possibility of photography one day reproducing the experience of seeing the world not only with colour but also stereoscopic depth and movement was unimaginable circa 1840.

Along with a concept of a more complete image, around the invention of photography we can also discern the tentative engagement of another mechanism that would drive the integral-image utopia: an aspiration for greater realism sparked by a change in the balance of verisimilitude, as a specific aspect of the reproduction of nature appeared to exceed others. Circa 1839, the new equilibrium was created not by the addition

2) Among other sources, the online archive of texts related to the daguerreotype edited by Gary Ewer (2018) is particularly useful.
3) On the attribution of this unsigned text to David Brewster, see Brunet (2017, p. 60).

on *The Haystack*, Talbot (1844) noted that photography would "enable us to introduce into our pictures a multitude of minute details which add to the *truth* and *reality* of the representation, but which no artist would take the trouble to *copy faithfully from nature*" (my italics). Robert Walsh (1839) recounted of his experience: "the graphic truth" of a Parisian cityscape "astonished and delighted me beyond measure. No human hand did or could trace such a copy." The augmented realism instituted by recording the action of light drew attention to the new image's concomitant shortcomings, however. Evidence of this destabilising effect can be found in the fact that the most common analogy used to describe photographs was a comparison to prints, especially aquatints.[4] Photographs were like what one would imagine "fixing" the image in the camera obscura to look like, *except* they lacked colour. Monochrome representation had existed since the dawn of imagery, but in photography it was suddenly jarring. It appears that the exactitude of mechanical inscription not only participated in thinking about faithfulness but created a novel concern: what was missing, or that of completeness.

Comparison to vision was essential to notions of the "total" image in the twentieth-century. Here we find an important disjunction with nineteenth-century thinking. Around the invention of photography, metaphors related to vision and the eye weren't nearly as common as one might expect in light of their later importance – or considering the fact that, as Michel Frizot (2018) has shown, parallels had been drawn between the camera obscura and the eye since Descartes in the seventeenth century (pp. 44–56). The camera–eye metaphor was

(or more convincing rendition) of colour, animation, depth, or sound, as later, but by a striking quality of the new photographic image itself: exactitude, or fine and unabridged transcription of detail. More than any other fundamental aspect of photography, exactitude was what fascinated viewers. Töpffer (1841) caricatured accounts of the first daguerreotypes of Paris, describing how viewers "had the infinite pleasure of recognizing the Pont-Neuf and, among the paving stones of the Pont-Neuf, every darkened, stained or cracked stone" (p. 7). When Talbot included a photograph of a haystack (Fig. 3) in his 1844 publication *The Pencil of Nature*, it was a choice that clearly epitomised this quality. Impartial and seemingly infinite detail was unique to photography, something introduced to imagery by mechanical inscription. We can associate exactitude with naturalistic realism because, for contemporaries, it was evidence of unprecedented proximity to nature. Commenting

much less prevalent around the invention of photography than Geoffrey Batchen (1997) suggests, citing its main occurrences (pp. 81–82). Crucially, such comparisons were also essentially limited to scientific spheres and tended to underline promising divergences between photographic and human perception, not to express a pictorial desire to bring them closer together.[5] Photography was understood as an optical instrument for rendering nature – a new form of mediation – rather than a tool for transcribing vision, however imperfectly. The public's engagement with exactitude via the practice of magnifying daguerreotypes is a prime example of this. Daguerre apparently provided a magnifying glass during his demonstrations,[6] and the fine detail thus revealed led to comparisons between photography and other optical devices, especially the microscope and the telescope (Morse, 1839; [Brewster], 1843). Photography was received in a culture of what Stephen Pinson (2012) has called "optical naturalism," in which "the approximation of a representation to nature" and "viewers' expectations" of such representations were "judged not only by what one sees with the naked eye, but also according to the effects of nature as seen through optical instruments" (pp. 55–56). Early ideas about the photographic image were clearly inscribed in this culture of "optical naturalism" and not in a utopian quest to reproduce the everyday experience of visual perception.

Douglas Nickel (2015) argues that "the idea of photography was not what sparked excitement in 1839, for the idea alone was evidently easy to ignore or dismiss." "Rather," he writes, "it was the successful realization of the idea [...] that captured the public's imagination" (p. 84). Naturalistic exactitude, observed in actual photographs, was the focus of this wonder – what epitomised the successful realisation of the idea of fixing the image in the camera obscura. In the first years of photography, before stereoscopy, colour, or animated effects became commonplace, the non-conceptualisation of the trio

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4) For eloquent examples, see Anonymous (1839a) and Anonymous (1839b).

5) The physicist Jean-Baptiste Biot was the most prominent sustainer of an analogy with vision in France. Biot was interested in the potential of photography for the study of light and of phenomena invisible to human visual perception (Levitt, 2009, pp. 130–134). He likened the sensitive surface to the retina in our eye, calling photography "an artificial retina provided to scientists by Mr. Daguerre" (Biot, 1839a, p. 7). He also noted dissimilarities between photography and vision. For example: "the eye sees in an indivisible moment, whereas Mr. Daguerre's substance needs several minutes" (1839b, p. 173).

6) This is strongly suggested by the frequency of accounts of using a magnifying glass and by the fact, described by Pinson (2012, p. 69), that Daguerre had encouraged optical inspection of the Diorama, sometimes supplying opera glasses and installing concave lenses that miniaturised the scene.

of illusions forming the integral-image utopia (or myth of total cinema) is a first argument against the theory that this ambition dates, fully fledged, back to the beginning of photography. The non-expression of an explicit desire to imitate direct visual perception more closely is another. But at the same time exactitude provided the first building block for the anticipation of a complete image – to the degree that it was possible to envision such a thing based on technologies of the time.

From envisioning the future to imagining the past

The ideal of a total image reproducing the world as we see it, with all its colour, animation, and depth, did not date back to the origins of photography. Was it therefore progressively formulated in reaction to the introduction into scientific or popular culture of the different illusions that came to compose it? In the 1940s, the discourses structuring histories of photography were acutely revealing of the integral-image utopia. Similarly, nineteenth-century historical accounts are a vital source for evaluating how this representation became established in the popular imagination. There has been limited interest in the ideas underlying nineteenth-century histories of photography. Scholars tend to qualify these accounts as largely "technical", for lack of a better word (Gasser, 1992; Brunet, 2017, pp. 162–163, 175), and although some have rightly argued against this stereotype (Gunthert, 2005) and nuanced its motivations (McCauley, 1997), they have not focused on precisely how technological innovation in photography was presented, and presented differently, over time. A survey of fourteen French, British, and American historical accounts from the 1840s to the early 1890s shows that while the idea

that colour was missing remained a constant, the introduction of illusions later associated with a total image – notably via popular forms of stereoscopy from the 1850s, then the idea of three-colour photography circa 1869 – had no discernable influence on the expression of an integral-image utopia. In particular, the association of colour and stereoscopic imagery with perceptual realism and the association of perceptual realism with progress – a key mechanism of this collective representation – even appeared to regress.

 In the historical accounts of photography studied from before the popularisation of stereoscopy (Claudet, 1843; [Brewster], 1843; Thierry, 1847; Ville, 1851; Wey, 1853), ideas regarding technological innovation revolved around better image quality, shorter exposure times, reduced fragility, and easier multiplication of the image. As early as 1843, there was a sense that great "progress" had already been accomplished on all these fronts. The daguerreotype was judged to be almost perfect in the 1840s – "leaving scarcely any thing to look for in the way of improvement" (Claudet, p. 110), "having nearly attained perfection" ([Brewster], 1843, p. 333). The idea that moving things were missing in photographs had disappeared. Paper photography needed more work for 1840s observers, but for writers of the early 1850s it had already been greatly improved by the use of glass negatives (Ville, p. xxvi; Wey, p. 292). These early histories all very briefly imagined how photography might be improved. In the 1840s, forecasts sometimes related to paper photography or to further reduction of exposure times, but the one prognosticative element on which all five authors touched was the recording of colour. Thoughts changed with time regarding whether it would one day be possible, showing that innovation influenced perception of the potential of

photography: in 1843, successfully recording colour appeared highly unlikely (Claudet, p. 110; [Brewster], 1843, p. 317); in 1847, it remained a challenge (Thierry, 1847, p. 30); in the early 1850s, under the influence of recent experiments by Becquerel and Niépce de Saint-Victor, one day photographing colour appeared certain (Ville, 1851, p. vi; Wey, 1853, p. 296). In these histories, there was no mention of stereoscopy or of the idea of animating photography: colour was the only illusion of the future integral-image utopia to elicit interest.

In the histories written during the period 1855–1880 – after stereoscopic imagery had become a major industry (Eastlake, 1857; Mayer & Pierson, 1862; Figuier, 1869; Tissandier, 1874; Davanne, 1877) – stereoscopy became a familiar presence and authors sometimes dedicated an entire chapter to the subject (Mayer & Pierson, 1862; Figuier, 1869; Tissandier, 1874). Colour remained central to envisioning the future: photography had made great strides, and historians were certain that it would continue to do so, but chromatic transcription was still *the* long-standing challenge related to its fundamental nature. For Eastlake (1857), "short of the coveted attainment of colour, no great improvement can be further expected" (p. 250). In the more structured histories, writers closed their historical discussions with colour, which appeared uniquely relevant to both the past and the future (Mayer et Pierson, 1862, p. 87; Figuier, 1869, p. 71; Tissandier, 1874, p. 173). If these authors pronounced themselves on the possibility of mastering colour they were hopeful. The "problem" was "close to being resolved" for Mayer and Pierson (1862, p. 87), and there was hope for a solution "in the near future" for Tissandier (1874, p. 173); for Tissandier (1874, p. 309), colour even promised to be one of "the richest branches of the tree planted by Niepce and

Daguerre" along with instantaneous photography and photo-mechanical printing. However, authors of the surveys studied never made a connection between colour and stereoscopy. And none mentioned the prospect of reproducing an illusion of animation using photography – even though devices for doing so had been developed in the 1850s and a handful of inventors had associated animation and stereoscopy (Mannoni, 2000a, pp. 235–247; Mannoni, 2000b, p. 139).

The illusions of the perceptual-realism trio were quite separate and had unequal importance in the minds of collodion-era historians. Anticipated progress was consistently tied to colour, but as the list of past innovations lengthened, photography of the future promised to be more multi-faceted with ever more numerous "applications" made possible by new technologies. Histories also started to express the view that progress happened in unforeseen ways (Figuier, 1869, p. 3; Davanne, 1877, p. v). This all refutes the belief that total cinema was a preconceived idea and that there was a widespread sense of working towards the combination of multiple illusions "missing" from photography. As stereoscopy then concrete ideas for photographing colour became part of the intellectual landscape, this desire did not come to structure the way either the past or the future was envisioned by the wider photographic community. The integral image as understood in the 1940s remained absolutely inconceivable at the end of the 1870s.

This absence of a shared project around total perceptual realism continued to be manifest in histories of photography published in 1880–1895, before the Cinématographe (Harrison, 1887; Gossin, 1887; Werge, 1890; Brothers, 1892). These works even appear to reflect a demotion of

both colour and stereoscopy in popular opinion: progress in these areas seemed stalled and innovations related to the gelatine dry-plate process had transformed photography in more thought-provoking ways. Authors writing circa 1890 structured their histories around different photosensitive processes, with Brothers singling out increased "rapidity" as the most prominent object of "progress made within the last thirty years" (1892, p. 16). Also a sign of the times, there was a tendency to think of historical change in terms of "evolution", with new forms of photography replacing the old (Harrison, 1887, p. 129; Werge, 1890, title; Brothers, 1892, p. 152). Photography's future wasn't always broached, although when it was, colour remained the dominant theme. For Brothers, it was "difficult to imagine in what direction except in regard to the fixing of natural colours, further discoveries may be looked for" (1892, p. 17). Yet colour was the "philosopher's stone" of photography (Brothers, 1892, p. 146), a "problem" that continued to "baffle" researchers (Brothers, 1892, p. 146; Harrison, 1887, p. 125) and a recurring object of hoaxes (Harrison, 1887, p. 123). Observers writing circa 1890 clearly were not convinced by the three-colour method (a landmark achievement for modern histories of colour), which had had no perceivable effect on notions of progress or on fascination with perceptual realism since its announcement at the end of the 1860s by Louis Ducos du Hauron and Charles Cros. Gossin (1887) didn't even mention colour. As for stereoscopy, it was essentially part of the past and not tied to any wider considerations: Harrison (1887) didn't address it, and for Werge (1890, p. 119) and Brothers (1892, p. 319) it was something that was once very popular. Animation was only very briefly and confusedly mentioned by one author (Brothers, 1892, p. 305). And, still, no writer surveying photographic history had yet suggested ties between the reproduction of movement, colour, and/or depth.

The histories studied reveal no strengthening of the mechanisms of the integral-image utopia between the first public years of photography and 1895. Neither the popularisation of stereoscopy nor the creation of the first (albeit very experimental) colour photographs appear to have changed the balance of perceptual realism in ways significant enough to elicit the desire for a total, immersive image reproducing vision. Furthermore, the historians reviewed never conceptualised the illusion of stereoscopic depth as related to colour, nor voiced interest in animated photography. The experience of vision was not promoted as a model for further innovations in photographic realism. The notion of total perceptual realism therefore came to mark collective representations of photography much later and much less gradually than has been assumed. On the eve of the divulgence of the Cinématographe, the integral-image utopia, or the "myth of total cinema", was non-existent.

The integral-image utopia: a post-cinematic myth

I have demonstrated elsewhere that starting in 1895, the experience of the Cinématographe spectacularly increased what Robert Spadoni (2007) calls "medium sensitivity" in photography, making viewers particularly aware of aspects of the image that went unremarked before (Timby, 2018). This new device seemed to be the ultimate technology for animating photography because the spectacle it provided was so lifelike. Based on the first accounts of cinema, I observed that

key mechanisms of the integral image utopia were manifest in 1895–1896: a changing balance in realism had created the sentiment that certain elements were missing (sound, colour) and that their addition would provide a complete reproduction of natural perception. Analysis of historical accounts of photography from 1896–1925 (Niewenglowski, 1896; Wall, 1902; Garrett, 1911; Potonniée, 1925)[7] now indicates that the experience of cinema was what inspired the idea that stereoscopy, colour, and animation were linked, and that they were all about perceptual realism. Although parallel advances with colour photography were also a contributing factor, post-Cinématographe historiography shows, for the first time, signs of all the mechanisms of the integral-image utopia being formulated.

After 1895, animated photography – absent from previous surveys – was immediately integrated into the historiography of photography. Niewenglowski (1896) mentioned the importance of cinema less than a year after it became public (p. 21). In the 1902 edition of his *Dictionary of Photography*, Wall added entries (absent in the 1889 edition) on the "Cinematograph" and the "Zoetrope", the latter with a historical orientation. A decade later, in 1911, Garrett concluded his volume with a chapter on "Animated photography" that included a vague discussion of pre-1895 history (p. 368). In 1925, in a chapter on "animated photography", Potonniée delved extensively into early history. After the commercialisation of the Cinématographe, the previously non-existent historiography of animated photography thus became *de rigueur* and progressively gained in depth.

After 1895, there was also a renaissance in interest in colour photography accompanied by a change in what was included when recounting its history. As with animation, this was clearly influenced by recent innovations – in particular Lippmann's 1891 interferential process for colour photography. Niewenglowski (1896) observed that Lippmann's difficult-to-use "direct" process had the effect of stimulating new work on "indirect" colour photography (p. 20). Indeed, except for Potonniée (1925), subsequent authors demonstrated real interest in the indirect, or three-colour, processes previously disdained by historians. Garrett (1911), for example, penned a long and detailed chapter on "Photography in Natural Colours" that included the history of three-colour techniques going back to 1867, including milestones never cited in nineteenth-century surveys. From the mid-1890s, the illusions of colour and animation gained in importance in the minds of contemporaries, and historiography was transformed, with that of colour re-evaluated and that of animation truly initiated for the first time.

With the new interest in colour and animation, stereoscopy was not discussed at any more length than before, but it underwent a revealing change in status. Authors of historical surveys started associating stereoscopy, animation, and colour in the same line of thought, as if the utopian ideal of the tripartite integral image had suddenly started to solidify under the influence of cinema. In 1896, Niewenglowski first drew a parallel between two of these illusions, writing: "Associated with the stereoscope, the camera makes it possible to give

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7)   Fewer histories were published during this period, narrowing my panel of texts. Gasser (1992) argues that there were essentially no new surveys published in the 1890s–1920s, attributing this in part to a transfer of "theoretical debate" toward periodicals and a disjunction between contemporary aesthetic trends and photography's history (pp. 54–55).

volume to objects. As for their colour, the problem is more difficult" (p. 19). After discussing colour, he then formulated the idea of a trio of illusions when observing: "It seemed that after the invention of stereophotography, the Cinématographe, and colour photography, which allowed us to reproduce objects with their triple aspect of shapes, movement, and colours, there was nothing left to expect from the photosensitive plate" (p. 21). In this way, after 1895, authors of historical surveys started to associate stereoscopy with perceptual realism, whereas before its interest had been that of a popular commercial "application" of photography. By the time Potonniée wrote in 1925, he reflected a sense of progress towards total perceptual realism in the very structure of his survey, with consecutive chapters dedicated to colour photography, projected images, stereoscopy, then animated photography.

In the post-1895 histories studied here, authors also associated photography and vision more frequently, and sometimes in ways they hadn't before, suggesting the parallel emergence of this key mechanism of the integral-image utopia. Niewenglowski (1896) made multiple analogies between photography and vision: the camera was a "real eye" even though it had "neither soul nor emotion"; "like our eye", the camera worked with artificial light, although "the photographic eye sees much faster than the human eye"; for this reason, the gelatine dry plate was called "the scientist's retina" (pp. 16–18). These comments reflect the recent upheaval in representations provoked by the vastly increased sensitivity of the new dry-plate process, but they are essentially like those (rare) remarks of the first decade of photography describing it as being like vision but different. Breaking more with tradition, Wall (1902) presented three-colour photography as being based on the

workings of visual perception – the first time this idea was advanced in the surveys studied. Similarly, Potonniée (1925) noted ties between the study of vision and the principles of both stereoscopy and animated imagery (pp. 288–290, 297). Referencing the subjective experience of visual perception, Niewenglowski (1896) remarked that photography allowed us to keep images of what had "happened in front of our eyes" (p. 17). It is interesting to note in passing that the same year, a well-known poster advertising the Cinématographe (Fig. 4) conveyed a similar idea by representing the spectacle as if viewers were seeing live action in front of them – on a stage, or possibly through a curtained window onto the world (although colour was visibly missing). In his 1911 history, Garrett described animated photography as "representing the movements taking place in the world around us" (p. 368). This wasn't quite saying it reproduced the world *we saw* around us, but it was close. Potonniée (1925), too, went in this direction when he described what was lacking in one instance "for the illusion to be complete and the true image of life" (p. 298). Taken together, such changes in the formulation of technical explanations and in the presentation of innovations can be seen as reflecting a new idea of realism in photography and the emergence of one of the markers of the integral-image utopia that culminated in the 1940s: a photographic image that promised to make possible the reproduction of the world as we see it.

Cinematography was the triggering factor in this dramatic shift in representations but it alone was not responsible. One of the key foundations of the integral-image utopia was colour, and it is significant that concrete advances in photographing colour (aided by new, "orthochromatic" dry plates) were also made around 1895. Although the Cinématographe created a

spark, the renewed promise that recorded colour (the "philosopher's stone" of photography for Brothers in 1892) was now within reach allowed this spark to ignite a fire, so to speak. I suspect that the idea that animation, colour, and depth naturally formed a trio was also furthered by the nature of the technological solutions being proposed for each. All of these visual effects, in their practical forms then being commercialised, depended on the creation and synthesis of multiple images. Here, the re-emergence of interest in three-colour photography contemporary to the birth of cinema is telling. As pre-1895 accounts of colour show, observers had previously discounted this solution, but cinematography proved the power of multi-image-based illusions. Recording visual phenomena via a sampling of information no longer seemed like an inadequate approximation: it was a powerful tool for producing an image that was perfectly convincing in its verisimilitude and with a basis in scientific method. In addition, from a practical standpoint, this created a cross-pollination of ideas, as inventors conceived new ways of creating one illusion by taking inspiration from techniques of combining images used for another (Timby, 2005; Timby, 2015, pp. 30–34, 60, 86–89). The confirmation cinema provided of the visual power of the synthesis of multiple images therefore surely contributed to making total perceptual realism seem feasible.

Between 1896 and 1925, all of the mechanisms of the integral-image utopia started to be expressed. The idea of a complete image as one including colour, depth, and animation was formulated in response to the change in balance in perceptual realism brought about by the invention of the Cinématographe. Widely held mental representations incorporated the notion that photography was capable of recording things as we see

them, or even the experience of seeing, and that its realism was augmented by imitating the functioning of our own physiological apparatus for visual perception. The future promised real progress in this direction. And, indeed, it seemed that multiple threads of past research had been converging all along towards this now-attainable objective. Historiography is therefore not just a source for detecting the integral-image utopia: the fundamental reorganisation of how both the future and the past were envisioned was an essential component of this collective representation. Potonniée's 1925 *Histoire de la découverte de la photographie*, the last in the chronological list of histories studied here, is particularly eloquent in this respect. Throughout, Potonniée (1925) postulated that early inventors had consciously strived to make possible a total image: Jules Duboscq, who first popularised stereoscopy in France, "was exceptionally intelligent" because "he sensed the future" of this invention (p. 288); people "scorned the inventors of primitive devices" for animation "on the pretext that they

made toys and were completely unaware of the future of their work", yet, Potonniée advanced, "[n]othing could be more untrue" (p. 299); and regarding Henry Cook, inventor of the Photobioscope, Potonniée asked rhetorically: "Couldn't it be said that he *saw* cinematography?" (p. 302). Historians now placed the very idea of the integral image in the minds of their predecessors.

The utopian "total" image that for Bazin (1946/2005) was the "guiding myth" of the invention of cinema was in fact invented in response to cinema, as a myth of total *photography*. It was a myth in the true sense of the word in that it established an accepted historical perspective – the quest for total perceptual realism – for making sense of technological innovations past, present, and future. It was formulated at a time when photographically recorded colour and movement suddenly erupted into public life as part of a cascade of inventions dependent upon the new photographic emulsions of the late nineteenth century. If myths attempt to resolve irresolvable binary oppositions (Levi-Strauss, 1964), then this one might be said to address photography's fundamental ambiguity as both natural and mechanical – making it crucial for writing a cultural history of photography as an image-making *technology*.

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