

# The “Return” of 3-D: On Some of the Logics and Genealogies of the Image in the Twenty-First Century

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## Trains of Thought

Martin Scorsese’s *Hugo* (2011) is set in Paris’s Montparnasse railway station, not a bad in-joke, when you think of it as a nod to the origins of cinema, now in 3-D. And though the film purports to tell the story of Georges Méliès as the true inventor of the cinema, it is the Lumière brothers and their seminal *Arrival of a Train* that is featured at a key point in the narrative, when Méliès the magician acquires vital filmmaking equipment and know-how from the Lumières. There is another in-joke inside the in-joke: the boy has a terrifying nightmare of a train roaring into Montparnasse station and nearly running him over, a scene which is repeated *for real* when Hugo is rescued by his tormentor, the station officer, as a set-up for the film’s happy ending. Yet for the cinephile, there is an in-joke within the in-joke within the in-joke. The train seen roaring twice into the station is not just any old train from the 1920s. It is the digitally enhanced proleptic train from Jean Renoir’s 1938 *La Bête humaine*, complete with Jean Gabin’s begoggled sooty face leaning out of the locomotive; Scorsese’s *mise en abyme* of film history in reverse is giving us this trainwreck as an in-joke in 3-D, considered as a temporal anamorph rather than an optical effect. Not only does it neatly balance the director’s homage to (French) film culture and cinephilia with a somewhat more ambiguous appropriation of Méliès’s genius as the “precursor” of Hollywood’s 3-D revival (making Scors-

ese, well-respected champion of film preservation, also the legitimate heir to Méliès's "lost" legacy). It also hints at a paradigm change in the way we might come to look at 3-D itself: not as a special effect in the field of cinematic vision but a different kind of mental image (or "crystal image," to use Gilles Deleuze's terminology),<sup>1</sup> fitting for an age when cinema (and television) history is likely to become the only history our culture has an affective memory of, an age when time has become a function of space. What train of thought might have led to this supposition?

### Digital 3-D—Case Already Closed?

It cannot have escaped anyone's notice that the most remarked-upon phenomenon of mainstream cinema in recent years has been the publicity effort orchestrated by the film industry to launch digital 3-D cinema as a new attraction. For future film historians, the 2009–10 film seasons will be remembered as the years of the "return of 3-D" and James Cameron's *Avatar* (2009) as its culmination: a film that made instant history as the biggest and fastest box office success ever, when it opened on 18 December, having earned close to three billion dollars worldwide within less than six weeks of its theatrical release.

Since then, mainstay industry directors like Robert Zemeckis (*Beowulf*, 2007), Steven Spielberg and Peter Jackson (*The Adventures of Tintin*, 2011), entire studios like Pixar (*Toy Story 3*, dir. Lee Unkrich, 2010), Disney (*Up*, dir. Pete Docter and Bob Peterson, 2009), and DreamWorks (*Shrek Forever After*, dir. Mike Mitchell, 2010), acknowledged auteurs such as Tim Burton (*Alice in Wonderland*, 2009), Michel Gondry (*The Green Hornet*, 2011), and—not to forget European greats—Wim Wenders (*Pina*, 2011) and Werner Herzog (*Cave of Forgotten Dreams*, 2011) all have embraced the new technology. Despite such high-calibre interest and endorsement, another prestigious and reputable consensus holds that the wave has already peaked, that the revival is sputtering, and that the operation has not been a success, either economically or aesthetically. Roger Ebert railed against 3-D from the start, regarding it as an aberration, a travesty, and an abomination:

3-D is a waste of a perfectly good dimension. Hollywood's current crazy stampede toward it is suicidal. It adds nothing essential to the

1. See Gilles Deleuze, *Cinema 1: The Movement-Image*, trans. Hugh Tomlinson and Barbara Habberjam (Minneapolis, 1986) and *Cinema 2: The Time-Image*, trans. Tomlinson and Habberjam (Minneapolis, 1989).

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moviegoing experience. For some, it is an annoying distraction. For others, it creates nausea and headaches. It is driven largely to sell expensive projection equipment and add a \$5 to \$7.50 surcharge on already expensive movie tickets. Its image is noticeably darker than standard 2-D. It is unsuitable for grown-up films of any seriousness. It limits the freedom of directors to make films as they choose.<sup>2</sup>

While Ebert now, with support from no less an authority than Walter Murch, considers the “case closed” against 3-D,<sup>3</sup> there is more than a hint of schadenfreude in Kristin Thompson’s articles on her and David Bordwell’s blog, *Observations on Film Art*, quoting an industry wag: “it’s as if the characters are actually reaching out of the screen . . . and robbing your wallet.”<sup>4</sup> In two consecutive entries, she cites statistics that purport to document the precipitous fall of 3-D at the box office.<sup>5</sup> Bordwell and Thompson were not alone in thinking that the big buzz and the big bucks around *Avatar* made it a one-off.<sup>6</sup> Mark Kermode sarcastically titled his put-down, “Come in Number 3D, Your Time Is Up.”<sup>7</sup>

These and many similar assessments confirm one of the dominant narratives of why there was a return to 3-D in the first place in the 1950s, with the advent of television. Hollywood once more panicked, this time in the face of increased competition from the internet and a dramatic drop in DVD sales. To combat the threat of piracy, as well as to upgrade the event character of going to a movie theater for a night out rather than watch a film as streaming video on your home entertainment centre, via Netflix or the iPad, Hollywood had to come up with a new gimmick—a special effect—and to hype a new attraction. The new gimmick in fact turned out to be an old gimmick that had already been short-lived the first time around, but because Hollywood does not have a memory, or is out of fresh ideas, 3-D tried again and failed again.

Such would be the canonical story, which can be backed with a brief

2. Roger Ebert, “Why I Hate 3-D (And You Should Too),” *Newsweek*, 9 May 2010, [www.thedailybeast.com/newsweek/2010/04/30/why-i-hate-3-d-and-you-should-too.html](http://www.thedailybeast.com/newsweek/2010/04/30/why-i-hate-3-d-and-you-should-too.html)

3. Ebert, “Why 3D Doesn’t Work and Never Will. Case Closed,” *Chicago Sun-Times*, 23 Jan. 2011, [blogs.suntimes.com/ebert/2011/01/post\\_4.html](http://blogs.suntimes.com/ebert/2011/01/post_4.html)

4. Quoted in Kristin Thompson, “Has 3D Already Failed? The Sequel, Part One: RealDighted,” [davidbordwell.net/blog/2011/01/20/has-3d-already-failed-the-sequel-part-one-realdighted/](http://davidbordwell.net/blog/2011/01/20/has-3d-already-failed-the-sequel-part-one-realdighted/); from figure reproduced on first page; hereafter abbreviated “H.”

5. “If the second, more modest goal is the one many Hollywood studios are aiming at, then no, 3-D hasn’t failed. But as for 3-D being the one technology that will ‘save’ the movies from competition from games, iTunes, and TV, I remain skeptical” (“H”).

6. See Daniel Engber, “Is 3-D Dead in the Water? A Box-Office Analysis,” *Slate*, 24 Aug. 2010, [www.slate.com/articles/arts/culturebox/2010/08/is\\_3d\\_dead\\_in\\_the\\_water.html](http://www.slate.com/articles/arts/culturebox/2010/08/is_3d_dead_in_the_water.html)

7. Mark Kermode, “Come in Number 3D, Your Time Is Up,” 23 Dec. 2009, [bbc.co.uk/blogs/markkermode/2009/12/come\\_in\\_number\\_3d\\_your\\_time\\_is.html](http://bbc.co.uk/blogs/markkermode/2009/12/come_in_number_3d_your_time_is.html)

reminder of the rise and fall (also called the Golden Age) of anaglyph 3-D from 1952 to roughly 1954. It began with *Bwana Devil* (dir. Arch Oboler, 1952) and *House of Wax* (dir. André De Toth, 1953) and ended two years later with *Creature from the Black Lagoon* (dir. Jack Arnold, 1954). In honor of Jane Russell, one should also add *The French Line* (dir. Lloyd Bacon, 1954), a reminder that 3-D as a special effect in the 1950s mostly concentrated on thrusting big, round, or pointy things at the audience—be it arrows, swords, boulders, or bosoms. Hampered by competing and incompatible technical systems (anaglyph and polarized 3-D), cumbersome glasses, restricted angles of vision, and suspected headaches, 3-D movies were indeed a passing fad for Hollywood. But the actual reasons for its failure in the 1950s are both simpler and more complex than this narrative suggests—and just as relevant, according to Thompson, for its comeback. And by the end of 1954, 2-D versions often significantly out-earned the 3-D versions, not least because theater owners were reluctant to convert to 3-D projection. In other words, by betting against it, they made failure a self-fulfilling prophecy.

One casualty, for instance, was Alfred Hitchcock's *Dial M for Murder* (1954), shot and advertised in 3-D but only ever released in 2-D. Meanwhile, in the movie subculture underground, 3-D films continued to be made: *The Stewardesses* (dir. Allan Silliphant, 1969) was the most profitable 3-D film before *Avatar*, relative to cost of production, suggesting unexpected parallels to another hugely successful (and paradigm-changing) film from 1969, *Easy Rider* (dir. Dennis Hopper), which, partly thanks to its music track, brought teenagers back into the movie theaters. The coincidence is less fortuitous than it seems; popular music and 3-D will, as we shall see, have their postponed rendezvous after all.

### The Counternarratives

I want to suspend the narrative of Ebert, Kermode, Thompson, and other Cassandras of 3-D to consider a few alternatives. My storyline rests on four apparently counterintuitive claims around 3-D:

1. Digital 3-D's (D3D) short-term goals are internal to the industry, while its long-term transformative effects will be felt on small screens, game consoles, and mobile screens—although it may, for a while, leave television in something of a limbo. Furthermore, the short-term industry strategy, pursued with the introduction of D3D, once accomplished, makes it almost irrelevant whether 3-D motion pictures on the big screen are a passing fad, a minority interest, or a major game changer.

2. 3-D has come back as a complement to our sound spaces and aural

systems of representation. We should not simply think of it as an improved, more realistic system of visual representation.

3. From a historical perspective, it can be argued that 3-D actually preceded 2-D in mechanical imaging and, in the form of stereoscopic slides, conquered fields as familiarly diverse-but-interdependent as the entertainment industry and the military, prior to the advent of the cinema, which appropriated part of stereo aesthetics and simultaneously suppressed knowledge of its popularity.

4. From an aesthetic perspective, D3D aspires to become, in the films themselves, an invisible rather than visible special effect. That is, much of the effort of directors, designers, and draftspersons working in 3-D goes towards naturalizing this type of technologically produced spatial vision, making it increasingly indiscernible.

My general thesis, drawn from these four narratives, is that 3-D is only one element resetting our idea of what an image is and, in the process, is changing our sense of spatial and temporal orientation and our embodied relation to data-rich simulated environments. By way of conclusion, I want to speculate on what such turns and returns indicate about the history of the cinema and our need to enlarge the cast of its *actors*.

### The Tail Wags the Dog

In the first of my alternative narratives, as it concerns contemporary Hollywood, D3D is not (only) a defensive damage-limitation exercise; we are not in the 1950s, where the film industry might have lost the family audience to television. Today, Hollywood is present in all media and all markets, off-line in physical space, online in virtual environments, and on the domestic and global markets.<sup>8</sup> Introducing an expensive new technology for just the big screen would mean Hollywood is in competition with itself, which makes no sense. The danger is less the web per se, but the web's business model, where so much content is either free or priced too low to return a profit because content on the web is a means to an end, not an end in itself. Hollywood's answer lies in franchise movies, merchandizing, themed entertainment, rather than 3-D. Even piracy and copyright protection are issues that require legal measures and internationally enforceable agreements rather than technical gimmicks or artificial access barriers, such as encryption.<sup>9</sup>

One of the key problems for the industry has been internal, namely,

8. See Tino Balio, "A Major Presence in All of the World Markets": The Globalization of Hollywood in the 1990s," in *Contemporary Hollywood Cinema*, ed. Steve Neale and Murray Smith (New York, 1998), pp. 58–73.

9. See the discussion of the Anti-Counterfeiting Trade Agreement (ACTA) and worldwide

how to convince exhibitors to take on the cost of converting to digital projection.<sup>10</sup> Here 3-D as an added attraction was aimed only indirectly at the public and more directly at the exhibitors; the extra admission fee was meant to help recoup the investment in digital projection.<sup>11</sup> Once the technology has been installed and amortized via a season of successful 3-D films, it does not matter whether 3-D is a big screen mainstay, or a niche product (only suitable for sci-fi, fantasy, and animation blockbusters), or for regular drama, thrillers, documentaries, and romantic comedies.<sup>12</sup> Another issue has been the digital projection systems that the majors are trying to foist upon all the exhibitors, whether they run megaplexes or art houses, whether they show 3-D or 2-D films. There's also the seemingly never-ending power struggle within the different branches of the industry; this argument is about the power to set binding standards, which is, only incidentally, about 3-D and only nominally about antipiracy measures.<sup>13</sup>

Already by the end of 2010, industry commentators reported that the strategy of using 3-D as a way of forcing theaters to adopt and fund digital projection had by and large succeeded, thanks to the films of the 2009–10

protests against its adoption in Don Melvin, "Activists Present Anti-ACTA Petition to EU," 28 Feb. 2011, [news.yahoo.com/activists-present-anti-acta-petition-eu-150531129.html](http://news.yahoo.com/activists-present-anti-acta-petition-eu-150531129.html)

10. "Exhibitors have a low-cost, proven, low-tech approach . . . and see no urgent need to go digital. . . . On the face of it, studios have most to gain. . . . Making and distributing fragile prints cost them about Dollars 1bn a year in the US alone. On the other hand, they say, updating US cinemas could cost Dollars 5 bn. Logic suggests . . . that the studios should come up with the funds. Yet . . . part of the problem is the eternal argument between studios and theatre owners . . . over the fair distribution of screen spoils" (Christopher Parkes, "Science Fiction the Old-fashioned Way," *Financial Times*, 18 May 2002, p. 11).

11. I do not wish to oversimplify a protracted process that began in earnest when seven Hollywood majors obtained antitrust permission and in March 2002 founded the Digital Cinema Initiative (DCI) to develop industrywide specifications for digital formats. One of the key factors in the conversion to digital exhibition was the institution of the so-called Digital Cinema Package (DCP), which includes a Virtual Print Fee (VPF) guaranteeing exhibitors a reimbursement or subsidy from the distributors in recognition of the fact that they are the major beneficiaries of the switch to digital prints (in other words, films stored and distributed as files on portable hard drives). David Bordwell has given a factually detailed narrative of the pros and cons of conversion; see David Bordwell, "Pandora's Digital Box: In the Multiplex," 1 Dec. 2011, [davidbordwell.net/blog/2011/12/01/pandoras-digital-box-in-the-multiplex/](http://davidbordwell.net/blog/2011/12/01/pandoras-digital-box-in-the-multiplex/)

12. In another sense, it is vital whether 3-D is suitable for other dramatic genres, once the function of the big screen as promotional attention window for the different small screens is factored in. For more on this, see below.

13. For a useful account of earlier rounds of struggles, see Richard W. Haines, *The Moviegoing Experience, 1968–2001* (Jefferson, N.C., 2003). The asymmetrical cost-benefit relation among production, distribution, and exhibition (with distributors anxious to control exhibition outlets by prescribing leasing arrangements of costly 4K equipment) is especially resented in Europe, where art house cinemas depend on projecting films on different formats and with open standard equipment.

season, such as *Up*, *Coraline*, *Avatar*, *Alice in Wonderland*, along with *Toy Story 3*, *Shrek*, *Ice Age*, and other Disney-Pixar animation films.<sup>14</sup> Unlike analogue 3-D, digital 3-D equipment can switch between 3-D films and 2-D films, although some technical hitches remain when watching 2-D digital films on 3-D enabled projection equipment.

However, my claim goes further. 3-D is hyped on the big screen also for the same reason that all films are hyped on the big screen: the theatrical release of a film is the marquee and billboard that allows a movie property to accrue cultural capital and enter all the subsidiary markets that eventually decide whether or not it is a commercial success. In some cases, the theatrical release of a film only accounts for 35 percent of its overall revenue across its lifespan and different media outlets, and over the past ten years up to 70 percent of even the theatrical gross of a film has come from overseas markets.<sup>15</sup> In other words, while a US theatrical release is now, economically speaking, merely the appendage to the Hollywood entertainment machine, without theatrical release a film does not exist, which makes big screen movie exhibition a striking example of the tail wagging the dog or, in another terminology, an instance of the logic of the supplement.<sup>16</sup>

No less paradoxical is the relationship between the first release of a film and the chain of subsidiary markets. As the window of attention has been getting tighter, with the opening weekend becoming the make-or-break event domestically as well as internationally, promotional budgets have also followed the logic of the supplement, accounting for more and more of the production cost. Yet this extreme focus on the time and location advantage of the first release imposes itself not merely because of piracy; it is another one of Hollywood's answers to the business models of the in-

14. "There has been a considerable increase in the number of screens with 3D projection systems, from 4,400 in May 2010 to 8,770 in early December. That's out of roughly 38,000. This growth presumably came in response to the huge success of *Avatar* and *Alice in Wonderland*. Anne Thompson's 'Year-End Box Office Wrap 2010' quotes Don Harris, Paramount's executive vice president of distribution: 'There are more screens, so a theater can now handle anywhere from two to three 3-D films at one time.' By year's end, there were roughly 13,000 3D-equipped screens outside the North American market. The number of 3D films per year has grown from 2 in 2008 to 11 in 2009 to 22 in 2010 to an announced 30+ for this year" ("H").

15. See Gloria Goodale, "Hollywood's Foreign Booty: New *Pirates* Film Earned over \$250 Million Abroad," *Christian Science Monitor*, 23 May 2011, [csmonitor.com/USA/Society/2011/0523/Hollywood-s-foreign-booty-New-Pirates-film-earned-over-250-million-abroad](http://csmonitor.com/USA/Society/2011/0523/Hollywood-s-foreign-booty-New-Pirates-film-earned-over-250-million-abroad)

16. The supplement, according to Jacques Derrida's formulation, both adds to and completes an entity already assumed to be whole and, as such, underscores the absence within a sense of full presence or wholeness; see Jacques Derrida, "Structure, Sign, and Play in the Discourse of the Human Sciences," in *Writing and Difference*, trans. Alan Bass (London, 2001), pp. 351–70. The big screen has become, in economic terms, the supplement of the cinematic institution as a whole, yet without this supplement the rest would disintegrate around its absence.

ternet, where mail order and subscription services like Netflix or Redbox represent as much a threat to Hollywood's economic survival as illegal downloads.<sup>17</sup>

Therefore, if the film business intends to introduce 3-D imaging as a new industry standard across the board (which is what my overall argument implies), then fictional stories showcasing its attractions still require the big screen and a theatrical release to introduce them, irrespective of whether these attractions are destined for quite other formats. Given the potential scope for 3-D images—outside of feature films on, for instance, mobile devices and for other forms of entertainment and information, including, above all, games and every manner of GPS supported location services, like maps (Google Earth and its Street View in 3-D), holiday snaps (the Microsoft 3D aggregator, Photosynth), as well as shopping, tourism, and home videos—it is safe to assume that 3-D is indeed aimed at a significantly greater market than multiplexes. On devices like smart phones or game consoles, the technical difficulties of credible 3-D are less daunting, since its spatial effects can now be produced without the disadvantages still encumbering 3-D films in theaters, such as glasses, headaches, and limited angles of vision. Hence another paradox: a film's 3-D supplement, felt as redundant by a movie buff like Ebert or Kermode, may nonetheless be functional in and for an entirely different viewing situation and user context.

Placed between an IMAX dome screen and an iPhone touch screen, the return of 3-D leaves television in something of a limbo. On the one hand, TV is an important transmitter of cinema content; even if 3-D films prove to occupy no more than the niche of animation films and children's features, TV will have to be able to show such premium content. On the other hand, as both broadcast and cable TV reinvent themselves in order to respond to the internet, many kinds of tie-ins with tourism, talent, and reality TV and cross-over programming with online shopping will become ever more prominent, so that 3-D-ready sets are in fact envisioned and

17. "Netflix . . . was becoming so powerful that studios worried they were following their music counterparts down an iTunes path. 'One buyer is your biggest nightmare,' Mr. Guber said. 'They can hear the rattle of your begging cup a mile away'" (Brook Barnes, "Web Deals Cheer Hollywood, Despite Drop in Moviegoers," *New York Times*, 25 Feb. 2012, [nytimes.com/2012/02/25/business/media/web-deals-cheer-hollywood-despite-a-drop-in-moviegoers.html?pagewanted=all](http://nytimes.com/2012/02/25/business/media/web-deals-cheer-hollywood-despite-a-drop-in-moviegoers.html?pagewanted=all)). Netflix, iTunes, and the iPad tablet, with the collapse of the DVD market, are perceived as disruptive services and technologies. Throughout 2010 and 2011, analysts tried to assess the threat (to Hollywood and cable outlets), while Netflix argued the benefits the company provided for the studios; see Tim Arango and David Carr, "Netflix's Move onto the Web Stirs Rivalries," *New York Times*, 24 Nov. 2010, [nytimes.com/2010/11/25/business/25netflix.html?\\_r=1](http://nytimes.com/2010/11/25/business/25netflix.html?_r=1), and Ben Fritz, "Netflix Fast Growth Continues in First Quarter as Company Defends Itself to Hollywood," *Los Angeles Times*, 5 Apr. 2011, [latimesblogs.latimes.com/entertainmentnewsbuzz/2011/04/netflix-fast-growth-contines-in-first-quarter-as-company-defends-itself-to-hollywood.html](http://latimesblogs.latimes.com/entertainmentnewsbuzz/2011/04/netflix-fast-growth-contines-in-first-quarter-as-company-defends-itself-to-hollywood.html)

being developed by global manufacturers, such as Toshiba, Hitachi, Samsung, and LG.<sup>18</sup> In the past, the staple software for introducing (and inducing the purchase of) new technological hardware in the home, such as color TV, stereo sound, or flat LED screens, has always been—besides movies—sports, big national or international events (coronations, royal weddings, Olympic games), or domestic pursuits, such as shared family pleasures in front of the TV and the more solitary pleasures of porn. So far, there is no indication whether demand on any of these fronts will tempt consumers into replacing their HD-TV sets with 3-D enabled ones. The 2012 London Olympics were widely touted as a potential “tipping point.”<sup>19</sup> “Serious” games, more integration of TV with the internet, and the guarantee of glasses-free TV will probably need to emerge before 3-D has a defined place in the domestic setting, a point in time perhaps when 3-D on smart phones and game consoles has become as unremarkable and common as the touch screen is today.

### Playing Catch-Up to the Revolution in Sound?

To come to my second counternarrative: if I am right in assuming that 3-D is a supplement to sound and hearing even more than to vision and seeing, then an altogether different dimension to the argument emerges. Much of the objection to 3-D on the part of critics and even filmmakers comes from the assumption that 3-D enhances vision and produces greater and greater realism—realism being one of the enduring, if questionable teleologies said to drive the history of the cinema and its chief technological innovations (silent to sound, black-and-white to color, 2-D to 3-D). The study of early cinema has shown that this is an erroneous history even without considering 3-D, which in any case already existed around 1902, when the Lumières (and not Méliès!) projected 3-D films at the Paris World Exhibition onto a giant screen.

Jeffrey Katzenberg, the former head of production at Paramount and Disney, and currently CEO of DreamWorks Animation, seems to share a similarly selective understanding of film history. Once called “The Jerry Falwell of 3D”<sup>20</sup> because of his missionary zeal—but looking more like a

18. The internet is full of speculation, tips, and consumer advice on 3-D television; see “3D TVs: What You Need,” *Consumer Reports*, Jan. 2011, [consumerreports.org/cro/electronics-computers/tvs-services/hdtv/3d-tvs/overview/index.htm](http://consumerreports.org/cro/electronics-computers/tvs-services/hdtv/3d-tvs/overview/index.htm), and Wendy Sheehan Donnell, “Buy a 3D TV Now or Wait?” *PC Magazine*, [pcmag.com/article2/0,2817,2365010,00.asp](http://pcmag.com/article2/0,2817,2365010,00.asp)

19. Molly McHugh, “The 2012 London Olympics Is 3D TVs’ Big Opportunity,” 15 Feb. 2012, [news.yahoo.com/2012-london-olympics-3d-tvs-big-opportunity-011206230.html](http://news.yahoo.com/2012-london-olympics-3d-tvs-big-opportunity-011206230.html)

20. See Patrick Goldstein and James Rainey, “Jeffrey Katzenberg: The Jerry Falwell of 3-D?” *Los Angeles Times*, 15 Sept. 2008, [latimesblogs.latimes.com/the\\_big\\_picture/2008/09/jeffrey-katzenb.html](http://latimesblogs.latimes.com/the_big_picture/2008/09/jeffrey-katzenb.html)

model for Shrek, one of his studio's more successful (now 3-D) franchises—Katzenberg is, along with S Spielberg and J Cameron, one of the chief promoters of 3-D in Hollywood. Katzenberg speaks of 3-D as the third revolution in cinema: “There have been two previous revolutions that have occurred in movies. The first one is when they went from silent film to talkies, and the next one happened when they went from black-and-white to color. Which was 70 years ago. In my opinion, this is the third revolution.” The surprising aspect of his “revolution” is not that he presents a rather too streamlined and goal-oriented version of film history but that he very much sees 3-D as taking “vision” out of what he calls its “vinyl” phase: “As human beings, we have five senses: touch, taste, smell, hearing and sight. And the two senses that filmmakers use to affect an audience are hearing and sight. And if you think about the evolution of sound, in our lifetime . . . [it] has gone from vinyl to an 8-track to a CD to digital. But sight is kind of at vinyl right now. *Whatever* sight—whether it’s in a magazine that you’re looking at, or it’s on a television set, or on your iPod, or in a movie theatre—we’re kind of, at vinyl.”<sup>21</sup>

While he seems to have conveniently forgotten Hollywood’s 3-D phase in the 1950s, his telling metaphor of vinyl (and thus its analogy with sound) leads to two further observations. For the past thirty years or so, Hollywood picture making has revolutionized itself in many ways, most clearly through digital production methods and a corresponding shift to outsourced postproduction; yet very few of its industrial and business innovations have actually been noted by the average viewer because so much in our movie-going experience has remained the same: the two-hour feature film, the narrative format, the genres-and-stars formula, the racked seating, the projector position, the social habit of going to the movies, and the popcorn and the soft drinks.

What, however, has changed substantially, and is often credited with having revived the film industry in the 1980s, is movie sound. Surround sound was itself influenced and inflected by the Walkman experience of the 1980s, making what used to be known as personal stereo become a collective, shared experience—a new kind of public intimacy conveyed through the sound space we share with others in the dark.<sup>22</sup> Dolby, multi-

21. Quoted in Bruce Handy, “Jeffrey Katzenberg on 3-D: Depth Becomes Him,” *Vanity Fair*, 23 Mar. 2009, [vanityfair.com/online/oscars/2009/03/jeffrey-katzenberg-on-3d-depth-becomes-him](http://vanityfair.com/online/oscars/2009/03/jeffrey-katzenberg-on-3d-depth-becomes-him)

22. The history of sound in the cinema has in recent decades become a fertile research area, thanks to the work of Rick Altman, Doug Gomery, James Lastra, Michel Chion, Claudia Gorbman, Kaja Silverman, and many others. For sound and the New Hollywood, see Gianluca Sergi, *The Dolby Era: Film Sound in Contemporary Hollywood* (Manchester, 2004).

channel directional sound has given the cinema a new spatial depth and dimension, which four key films from the mid-to-late 1970s (*Nashville*, *Jaws*, *Star Wars*, and *Apocalypse Now*) pioneered very successfully—each in its own way—in order to redefine the movie experience. Is Katzenberg, then, merely stating the unexpected but retrospectively obvious: 3-D images are the belated catch-up, finally drawing level with three-dimensional sound?

If so, it has to do with the generally changing relation in our culture between sound and image. More and more, it is sound and noise that define public and private space, inner and outer worlds, norm and deviancy. At least since Dolby noise reduction systems were introduced, sound has been experienced as three-dimensional, “filling” the space the way that water fills a glass but also emanating from inside our heads, seemingly empowering us, giving us agency, even as we listen passively. In the cinema, the traditional hierarchy of image to sound has been reversed in favor of sound now leading the image or, at the very least, giving objects a particular kind of solidity and materiality. It prompted Christian Metz to speak of aural objects,<sup>23</sup> a notion used to good effect in the 2012 Oscar winner, *The Artist* (dir. Michel Hazanavicius, 2011), a “silent” film where the main protagonist who refuses to believe in the talkies has a nightmare that everyday objects such as a water glass or chair suddenly take on a sinister aural life in his otherwise soundless world. The return of 3-D would then be part of a broader culture of technologically induced synaesthesia or sensory substitution, where sound becomes “a modality of seeing,” making vision an appendage to hearing, with monocular sight increasingly submerged in the sea of stereo sound.<sup>24</sup>

But there is a further aspect to sound that is crucial in the shift to 3-D: if we think how quickly—and for the record companies, how profitably—the entire human archive of recorded sound was digitally remastered with the arrival of the CD and how readily consumers accepted and adapted to it, then one can understand why the holy grail for the owners of Hollywood-film libraries is the prospect of digitally remastering our film heritage in 3-D. It is technically possible and, while still expensive (until recently), it is the openly stated goal of someone like Cameron, who owns several of the necessary patents for doing so.<sup>25</sup> It might even give a boost to

23. See Christian Metz, “Aural Objects,” trans. Georgia Gurrieri, *Yale French Studies*, no. 60 (1980): 24–32.

24. See, for instance, [seeingwithsound.com](http://seeingwithsound.com) for new ways of using sound to assist the visually impaired. Sensory substitution has become a major topic in neuroscience; see Alva Noë, *Action in Perception* (Cambridge, Mass., 2004).

25. See “Titanic to Be Relunched in 3D but James Cameron Warns ‘Don’t Expect Another

collapsing DVD sales by bypassing theatrical release and tempting consumers to implement 3-D as the new default screen on their televisions and laptops, if both new and familiar software becomes available. To promote 3-D on the big screen *today* would then be a way of investing in 3-D on the small screen *tomorrow*.<sup>26</sup>

### The Many Histories of 3-D—and a Different Genealogy for the Cinema

To substantiate my main thesis that 3-D has made its reappearance as only one part of an emerging set of new default values—about how to locate ourselves in simultaneous spaces, multiple temporalities, and data-rich, simulated environments and, thus, how to live in and with images—I need to recapitulate some of the manifold and continuous, but often submerged, histories of stereoscopy and 3-D.

For a film historian, the “return of 3-D” prompts, first of all, a brief reflection on the very idea of return. In view of an alternative genealogy of cinema—made possible or desirable by any number of phenomena only provisionally subsumed under the transition from analogue (lens-based) cinema to digital (postfilm) cinema—the return of 3-D might be better described as either never having been away or as the return of the repressed. Once one traces 3-D back not only to the 1950s (or 1920s, or the Lumière brothers around 1900)<sup>27</sup> but takes the longer view and recalls the extensive practice of stereoscopic images in the nineteenth century,<sup>28</sup> one is quickly led back to the phantasmagorias of the late eighteenth century, the panoramas, dioramas, and other spatial projection methods that for cen-

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*Avatar*,” 16 Mar. 2010, [dailymail.co.uk/sciencetech/article-1258336/Titanic-3D-James-Camersons-Avatar-followup-2012.html](http://dailymail.co.uk/sciencetech/article-1258336/Titanic-3D-James-Camersons-Avatar-followup-2012.html)

26. Cameron acknowledges that 3-D conversion should not be done on the cheap and spent nearly twenty million dollars on converting his 1997 blockbuster *Titanic* for 3-D rerelease in April 2012, the one-hundredth anniversary of the sinking of the *Titanic*. However, he, too, believes that domestic television programming is necessary to make 3-D the new default value; see Scott Hettrick, “Cameron: TV Will Drive 3D,” 23 Sept. 2011, [hollywoodinhidef.com/2011/09/cameron-tv-will-drive-3d-success/](http://hollywoodinhidef.com/2011/09/cameron-tv-will-drive-3d-success/), and Edward C. Baig, “*Avatar* director James Cameron: 3D Promising, but Caution Needed,” *USA Today*, 11 Mar. 2010, [content.usatoday.com/communities/technologylive/post/2010/03/james-cameron/1#.UCvghkJm2-9](http://content.usatoday.com/communities/technologylive/post/2010/03/james-cameron/1#.UCvghkJm2-9)

27. For the most exhaustive history of 3-D cinema to date, see Ray Zone, *Stereoscopic Cinema and the Origins of 3-D Film, 1838–1952* (Lexington, Ky., 2007).

28. Jonathan Crary’s *Techniques of the Observer* is still the best-known study of the impact of stereoscopy on nineteenth-century theories of vision, optical toys, and image practices not conforming to accounts that assume a direct line of descent from Renaissance perspective to the principles of the cinematograph; see Jonathan Crary, *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century* (Cambridge, Mass., 1990).

turies have existed in parallel to the history of monocular perspective.<sup>29</sup> Rather than speaking of a return of 3-D, it is best to once more invoke the logic of the supplement, with 3-D remaining invisible or un(re)marked because of particular historical or ideological pressures but always already inherent in both still and moving pictures. Assuming for a moment that one conceives of cinema not in terms of animated photographs in motion (as a pictorial art form capable of rendering on a two-dimensional surface the illusion of three-dimensional depth and turning intermittent succession into the illusion of movement), the cinema's telos can plausibly be reconstructed as the elimination of a frame or limit to the perceptual field, indeed as driven by the tendency to self-abolish its apparatic scaffolding and peculiar geometry of representation. Already present in one of André Bazin's ironic ruminations in the 1950s ("no more cinema!"), this is also the perspective put forward by Akira Lippit:

Because the discussions of 3D cinema have often veered toward the history and theory of optics (nineteenth-century explorations of stereopsis, techniques of 3D rendering in film), its relation to genres of excess (horror, soft-porn, exploitation) and its function as a precursor of new media (virtual reality, interactive media), the persistence of 3D cinema as a recurring but wishful dream has been elided. . . . The impulse toward stereoscopic cinema is sustained by a fundamental cinematic desire to eliminate the last vestige of the apparatus from the field of representation, the film screen. . . . In this light, stereoscopic cinema can be seen not only as a technological extension of flat cinema, a surplus dimension, but as the dimension of its unconscious. 3D cinema represents the desire to externalize the unconscious of cinema.<sup>30</sup>

29. See Stephan Oettermann, *The Panorama: History of a Mass Medium*, trans. Deborah Lucas Schneider (New York, 1997).

30. Akira Mizuta Lippit, "Three Phantasies of Cinema—Reproduction, Mimesis, Annihilation," *Paragraph* 22 (Nov. 1999): 213–14. Lippit begins his essay with a flourish:

Among the great expectations of cinema, unfulfilled to the extent it was anticipated, remains the unrealized dream of a viable three-dimensionality. The technical advances that characterized the evolution of cinema during the twentieth century seemed to destine cinema toward a fantastic state of total representation, a *phenomenography* of life. To accomplish this, cinema needed to surpass, at some moment, the limitations of the basic apparatus—screen and projection—and provide a synthetic experience of the world, not just its reproduction. Cinema would have to move, at the very least, from the confines of two-dimensional representation to the plenitude of three-dimensional space. Stereoscopy came to serve as a focal point for this projection, promising the transformation of flat cinema into a voluminous *supercinema*, and ultimately a form of anti-cinema. The drive to complete cinema, to perfect its mimetic capacities, suggested the eventual elimination of cinema as such. At the end of the twentieth century . . . the medium continues to be haunted by its failure to overcome itself. [P. 213]

Even as one might wish to nuance the bold strokes of this lightning sketch of an alternative teleology to the usual one of realism/illusionism, Lippit's point is well taken, and the question arises, why did the framed view come to dominate imaging and picture making from the late fifteenth century to the late nineteenth century when other systems were both technically feasible and popular? There have always been avant-garde movements or artists who contested the monopoly of the monocular paradigm. In the modern period, the better-known challenges to perspectival representation came from painting. They roughly coincided with the period during which photography and then the cinema emerged into prominence. J. M. W. Turner comes to mind, who in the 1840s started to paint what was impossible to capture through photography: pictures that had no fixed horizon or that required a mobile point of view like the celebrated *Rain, Steam, and Speed—The Great Western Railway* (1844), painted after Turner had put his head out of the window of a railway carriage for a full nine minutes, or the equally famous *The Slave Ship* (1840), which forces the viewer to position him- or herself in fatal proximity with the dying and shackled slaves, who were thrown overboard to drown so that the vessel's owner could collect extra insurance money.<sup>31</sup>

The other challenge to perspective came from, of course, cubism and futurism, which cut up the homogeneous space of Renaissance painting into segments representing temporal succession and the observer's spatial displacement. Notwithstanding the proximity of Eadweard Muybridge's chronophotography to cubism—if we think of Marcel Duchamp's seminal *Nude Descending a Staircase* (1912)—the popularity of photographic practice in the culture at large and the advantages of apparatus-free monocular view over stereoscopic vision in moving-image making led to a mode of representation in the cinema that generally favored two-dimensional images, projected onto a flat screen and surrounded by a frame, offering the illusion of spatial depth in much the same way that the central perspective organized pictorial space: around a single vanishing point, recession in depth, shading and graded color schemes, and the corresponding scaling of size and distance of objects, space, and human figures.

However, for the cinema to take this option was neither as natural nor as inevitable as it might appear in retrospect. More careful film historical research has shown that during the first ten to fifteen years of motion picture history there is ample evidence to suggest that filmmakers could and did draw on quite a wide range of techniques and traditions in the

31. On J. M. W. Turner, see John Gage, *Turner: Rain, Steam, and Speed* (London, 1972), and Gerald E. Finley, *Angel in the Sun: Turner's Vision of History* (Montreal, 1999).

organization of pictorial space, resulting in styles of *mise-en-scène* and modes of spatiality that—if viewed from the normativity of Renaissance perspective—seem deviant at best and inept at worst. And so they were often judged, until the combined efforts of a generation of early cinema scholars were able to prove that there is a historical logic to the Lumière brothers' exaggerated diagonals in *Arrival of a Train*, to Edwin S. Porter's cowboy, shooting straight at the spectator in *The Great Train Robbery* (1903), itself a typical stereo effect.<sup>32</sup> We have learned again to read D.W. Griffith's highly idiosyncratic staging in *A Corner in Wheat* (1909), or his emphasis on the frame edges while leaving the center empty in *Musketeers of Pig Alley* (1912), just as scholars have come to prize the *trompe l'oeil* effects of Ferdinand Zecca's *The Ingenious Soubrette* (1903), G. A. Smith's *Grandma's Reading Glasses* (1900), Franz Hofer's silhouette cut-outs in *Weihnachtsglocken* (1914), or the impossible spaces of James Williamson's *The Big Swallow* (1901), previously regarded as incoherent, idiosyncratic, or primitive.<sup>33</sup>

But these nonstandard cinematic spaces are themselves embedded in the long battle of stereoscopic vision versus monocular vision, which is also part of the status contest over prestige and discursive power between popular culture and high culture among the arts in the nineteenth century. Film historians, especially film theorists of the cinematic apparatus, have tended to forget just how widespread, diverse, and popular stereo slides were from the middle of the nineteenth century onwards.<sup>34</sup> It comes as a surprise to learn in what huge numbers they were produced, distributed, and consumed: adopted in schools, or enjoyed in the home with portable stereo viewers, used for business as visiting cards, as well as in public, thanks—at least in Europe—to the widely installed *Kaiserpanoramas*: the circular viewing galleries, where up to twenty-four people could watch the same slide show simultaneously.<sup>35</sup>

32. For a general overview of the relation between stereoscopy and early cinema, see Charles Musser, *The Emergence of Cinema: The American Screen to 1907* (Berkeley, 1994). In 1915 Porter and William E. Waddell managed to screen 3-D moving pictures to an audience at the Waldorf Astoria Hotel, New York.

33. On Franz Hofer, see Michael Wedel, "Melodrama and Narrative Space: Franz Hofer," in *A Second Life: German Cinema's First Decades*, ed. Thomas Elsaesser (Amsterdam, 1996), pp. 123–31. An extensive discussion of *The Big Swallow* can be found in Jennifer M. Barker, *The Tactile Eye: Touch and the Cinematic Experience* (Berkeley, 2009), pp. 158–60.

34. The most successful US companies for mass-manufacturing stereo slides were Underwood & Underwood, in the 1890s the largest publisher of stereo views in the world, producing up to 10 million views a year, while the Keystone View Company of Meadville, Pennsylvania was one of largest distributors, especially to schools.

35. See Dieter Lorenz, *Das Kaiserpanorama: Ein Unternehmen des August Fuhrmann* (Munich, 2010). See also Carolin Duttlinger, "'Die Ruhe des Blickes': Brod, Kafka, Benjamin,

We owe to Walter Benjamin one of the best-known and most eloquent descriptions of the Berlin *Tiergarten Kaiserpanorama*, mentioned both in *One-Way Street* and his *Berlin Childhood around 1900*: “The travel images you found at the imperial panorama had the great charm that it did not much matter by which one you started the tour. The screen, with places to sit down in front of it, was actually round, and each image thus travelled through all the stations from which you could look at the pale colors, through a double window, far away.”<sup>36</sup> Oddly enough, Benjamin here fails to mention that the images were stereoscopic views. However, one of the sections of *One-Way Street* is entitled “stereoscope,” where he uses the term figuratively in order to describe moments of spatiotemporal displacement in the modern city. That the device itself served as a telling metaphor is an indication that the practice was sufficiently remembered and embedded in the culture.

What is remarkable, then, is how and why this knowledge of stereoscopy came to be repressed in the early twentieth century with the proliferation of cinema, thereby giving a major boost to the painterly paradigm of generating the illusion of a 3-D space out of a 2-D surface. No doubt, the drive to make the cinema respectable and to adjust its spatial coordinates to the bourgeois theater and its compositional codes to salon painting may have been contributing factors.<sup>37</sup>

The plebeian aspect of 3-D also goes some way to explain why the anti-bourgeois, antiart avant-gardes, notably dada and surrealism, kept 3-D imaging and its effects alive, especially when one thinks of Duchamp’s roto-relief disks and his palindrome of a film *anemic cinema*, not to mention the *Small Glass*—also known as “To Be Looked at (from the Other Side of the Glass) with One Eye, Close to, for Almost an Hour”—a witty deconstruction of monocular vision by a stereoscopic ocular ensemble, to which Duchamp adds a temporal dimension.<sup>38</sup>

Similarly, several of the practitioners of the so-called absolute film, no-

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and the *Kaiserpanorama*,” in *Science, Technology, and the German Cultural Imagination*, ed. Christian Emden and David Midgley (Oxford, 2005), pp. 231–55.

36. Walter Benjamin, “Kaiserpanorama,” *Berliner Kindheit um Neunzehnhundert*, in *Kleine Prosa*, ed. Tillman Rexroth, vol. 4 in 2 pts. of *Gesammelte Schriften*, ed. Rolf Tiedemann and Hermann Schweppenhäuser (Frankfurt, 1980), 1:240; my trans.

37. How complex a process of mutual give and take this struggle turned out to be can be seen in Ben Brewster and Lea Jacobs, *Theatre to Cinema: Stage Pictorialism and the Early Feature Film* (New York, 1997).

38. On Duchamp and stereoscopic vision, see Rhonda Roland Shearer et al., “Duchamp’s Revolutionary Alternative in the Context of Competing Optical Experiments,” *Tout-fait* 1 (Dec. 2000): [toutfait.com/issues/issue\\_3/Multimedia/Shearer/Shearer10.html](http://toutfait.com/issues/issue_3/Multimedia/Shearer/Shearer10.html)

tably Viking Eggeling, Oskar Fischinger, and Walter Ruttmann, as well as Man Ray, Francis Picabia, and Hans Richter, were fully aware of the visual-conceptual possibilities offered by simulating by graphic means the impression of seeing in depth.<sup>39</sup> Their efforts can be counted as part of the general revision of the Renaissance paradigm in the 1920s and their refusal to subject the cinema entirely to its rules and ideology.

Fast-forwarding to the 1960s and 1970s—whether to Andy Warhol's *Outer and Inner Space*, Dan Graham's *Time Delay Rooms*, Michael Snow's *Two Sides to Every Story*, or to Ken Jacobs's revival of stereoscopic slides in strobe animation experiments such as *Capitalism:Slavery*, discovering depth in decaying color photographs (*Razzle-Dazzle*), his found-footage film *Disorient Express* (1996), or the reworking of his famous *Tom, Tom, the Piper's Son* (1969) into *Anaglyph Tom* (2008)—each artist and work are tapping into genealogies of unorthodox spatial dispositifs in the realm of still and moving images, either manipulating depth cues or simulating multidimensionality or sometimes both.<sup>40</sup>

Jacobs is especially remarkable for his many do-it-yourself ways of achieving the illusion of spatial depth, using stroboscopic effects, flicker, and the so-called Pulfrich technique, which involves placing lighter and darker lenses successively in front of the eye. Inventing the technique after he had lost the use of one eye during World War I, Carl Pulfrich realized that delaying the flow of light to one eye via a tinted filter would produce a result similar to a stereoscopic view. Pulfrich, like Duchamp—and at about the same time—made use of delay (a temporal disparity, that is) by adding to images the fourth dimension of *time*, which the mind reconstituted into spatial terms as if it were a parallax horizontal disparity.<sup>41</sup> Jacobs, by reviving these and other hand made and apparently obsolete techniques, has shown that such devices of time-space dis- and reorientation of the viewer are far from exhausted, either aesthetically or politically, allowing one even to trace a line of descent from Turner to Jacobs, from *Rain, Steam, and Speed* to *Disorient Express*, or, better still, from *The Slave Ship* to *Capitalism:Slavery*.<sup>42</sup>

39. On Hans Richter, see Malcolm Turvey, "Dada between Heaven and Hell: Abstraction and Universal Language in the Rhythm Films of Hans Richter," *October*, no. 105 (Summer 2003): 13–36.

40. On Ken Jacobs's different cinematic, paracinematic, and spatiotemporal dispositifs, see *Optic Antics: The Cinema Of Ken Jacobs*, ed. Michele Pierson, David E. James, and Paul Arthur (New York, 2011).

41. For a detailed explanation of the Pulfrich effect, see [pulfrich.siuc.edu](http://pulfrich.siuc.edu)

42. Commenting on *Let There Be Whistleblowers* (2005), Jacobs explains: "The original film, *Sarnia Tunnel*, 1903, is in the Library of Congress. In 1996 I used it to create the Nervous System performance work, *Loco Motion*, (25 min). Steve Reich's music brought about an entirely

Generally, however, the North American film avant-garde exploration of 3-D had, under the sway of Duchamp's enigmatic minimalism, been more influenced by sculpture and performance than by painting. Taking one's cue, for instance, from Anthony McCall's now canonical projector-installation, *Line Describing a Cone*, one can open up another genealogy altogether for the cinema in its contemporary mainstream 3-D manifestations.<sup>43</sup> For McCall's take on the cinematic apparatus from 1973—then understood as a materialist demystification of the illusionist device, but now more admired for its poetic, mysterious sculptural qualities of time and embodiment—refers us back to Athanasius Kircher's camera obscura, via Etienne Robertson's phantasmagorias and *Pepper's Ghost*, as another of the many devices intended to give spatial volume and body to projected light.<sup>44</sup>

Such an alternative genealogy, tracing lines of descent of monocular cinema's illegitimate brother, the camera obscura, but blood-related to the gypsy beauty from the fairground and the itinerant magic lanternist, highlights the main point of my third counterintuitive narrative: 3-D preceded 2-D in mechanical imaging but that 2-D won the battle of the standards largely because of photography's superior software and cultural status. In which case, the current turn to 3-D would not only be the compulsive return of something repressed in the very identity of cinema but may also herald that the firm hold photography has had on the ontology of the cinema is in the process of being broken—a precondition, almost, for a

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different development." As to *Ontic Antics Starring Laurel And Hardy; Bye Molly* (88 min.), it was

the 1929 Laurel and Hardy short *Berth Marks*, filmed twice, with and without sound, [that] is our glorious take-off point. In some ways *ONTIC ANTICS* now goes beyond what had been possible in live performance, especially the new (purely-digital) 3-D coda. The foot-stool that becomes a live puppy, however, is no computer effect but comes from rapid juxtaposition of opposing left-right frames, just as in the live performance. . . . For the last 15 minutes, *Ontic Antics* can be visually enhanced by the use of a gray Pulfrich filter in front of one of the viewer's eyes. An inch of plastic absorbing some of the light, it can deepen apparent depth and change direction of movement. [Ken Jacobs, "Let There Be Whistleblowers and *Ontic Antics*," [expinema.com/site/en/home/dvd/ken-jacobs-let-there-be-whistleblowers-ontic-antics-starring?Itemid=60](http://expinema.com/site/en/home/dvd/ken-jacobs-let-there-be-whistleblowers-ontic-antics-starring?Itemid=60)]

43. See *Anthony McCall: The Solid Light Films and Related Works*, ed. Branden Wayne Joseph, Jonathan Walley, and Christopher Eamon (Evanston, Ill., 2005).

44. Here I signal the exceptional research of Tom Gunning on the history of the phantasmagoria in two magisterial essays: "Phantasmagoria and the Manufacturing of Illusions and Wonder: Towards a Cultural Optics of the Cinematic Apparatus," in *The Cinema, a New Technology for the Twentieth Century*, ed. Andre Gaudreault, Catherine Russell, and Pierre Veronneau (Lausanne, 2004), pp. 31–44 and "The Long and the Short of It: Centuries of Projecting Shadows from Natural Magic to the Avant-Garde," in *The Art of Projection*, ed. Stan Douglas and Eamon (Ostfildern, 2009), pp. 23–35.

better understanding of what is an image and what is cinema in the digital age. It suggests that 3-D is important less for being the cinema's inevitable make-or-break future destiny and more because it helps us have a better understanding of its past history.

### What Is an Image Today?

The detour by way of the history of spatial vision across an alternative genealogy of cinema (one that includes its digital future because it is already part of its past), allows the fourth of my counternarratives to come into view. Claiming that 3-D today should be regarded as part of and symptom for a broader change in our perceptual and sensory default values also includes a different awareness of bodily orientation and physical location. Embedding in layered spaces, navigating multiple temporalities, and interacting with data-rich, simulated, and hybrid environments probably requires redefining what we mean by seeing, by images, and how to differentiate the latter from pictures—an undertaking well under way in art history, media studies, and philosophy.<sup>45</sup> Following a line of inquiry laid out by Ludwig Wittgenstein, Martin Seel summarizes what is involved in seeing:

*To see something, to see something as something, and to see something in something are three basic instances of seeing; they come together in seeing pictures.*

Surveyable surfaces that in their appearance bring something to appearance call for complex seeing. . . . The general concept of seeing is that of seeing something; all living beings capable of seeing can see in this way. They are in a position to distinguish objects and movements by virtue of visual perception.

To see something *as something*, on the other hand, is a much more specialized ability; the ability of conceptual distinction is included in it. The mere seeing *of* something becomes seeing *that* such and such is the case, for example, that there is an umbrella hanging there. In contrast to a seeing that simply perceives, here it is a matter of epistemic seeing.

To see a picture, we have to be able to perceive an object among other objects—and we have to be able to perceive it *as a picture*. Identifying and re-identifying forms in pictures (as many animals master) is not enough here. Identifying something as well as the more elabo-

45. See Hans Belting, *The End of the History of Art?* trans. Christopher S. Wood (Chicago, 1987), W. J. T. Mitchell, *What Do Pictures Want? The Lives and Loves of Images* (Chicago, 2005), and James Elkins, *The Object Stares Back: On the Nature of Seeing* (New York, 1996).

rate identifying of something *as* something are indeed necessary pre-suppositions of seeing pictures, since to recognize a pictorial presentation it is necessary to have the ability to discriminate visually what is specifically presented.<sup>46</sup>

These distinctions are helpful, for instance, in dispelling simplistic attacks on illusionism in film studies and clarifying the contested concept of representation.<sup>47</sup> In order to comprehend what connections there are among seeing, sensing, acting, and interacting, Gilles Deleuze has distinguished between “movement images” and “time images”—another body of thought about images widely discussed and applied.<sup>48</sup> Rather than enter into these well-documented debates, I want to illustrate two specific problems, as they affect our understanding of 3-D, by adducing no more than anecdotal evidence from my own experience. The first concerns our perception of moving pictures and their internal organization; the second concerns a possible cultural shift in our response to and use of images. In May 2009, well before the launch of *Avatar*, I gave a talk at the Ludwig Museum in Cologne to introduce a special screening of *Creature from the Black Lagoon* (dir. Jack Arnold, 1954), complete with 3-D anaglyph cardboard glasses and a suitably equipped viewing theater. The Bonn film museum had shipped the print and brought their own crew; it took them almost a day to rig up the equipment, and, given the location, the screening became more like an art event or an installation piece. However, the auditorium was packed with young people, summoned by cell phones and Facebook and producing a buzz of excitement and expectation such I had not seen since the rerelease of *Star Wars*, inadvertently proving that going vintage was indeed very much *in*.

But it also proved that while most of the thrusting effects of this 3-D classic seemed inept, with the creature’s webbed claws looking more like someone poking a garden rake in our faces, the underwater scenes were poetic, enthralling, and mesmerizing, even after all these years. Scenes that have no horizon, where characters are floating or leaping, flying or swimming seemed to work much better in 3-D than scenes with people walking or talking in shot-counter-shot. This gives a clue to why *Avatar* is such an

46. Martin Seel, *Aesthetics of Appearing*, trans. John Farrell (Stanford, Calif., 2005), p. 179.

47. Among the best-known studies are Kendall L. Walton, *Mimesis as Make-Believe: On the Foundations of the Representational Arts* (Cambridge, Mass., 1990); Mitchell, *Picture Theory: Essays on Verbal and Visual Representation* (Chicago, 1994); Richard Allen, *Projecting Illusion: Film Spectatorship and the Impression of Reality* (Cambridge, 1997); and Norman Bryson, *Vision and Painting: The Logic of the Gaze* (New Haven, Conn., 1989).

48. See Deleuze, *Cinema 1* and *Cinema 2*.

exhilaratingly kinetic and bodily experience<sup>49</sup> and why Wenders and Herzog were well-advised to choose dance (*Pina*, 2011) and cave drawings (*Cave of Forgotten Dreams*, 2011) for their first serious forays into 3-D documentaries. Nick James put it differently though still evoking the same sense of floating motion: “As a spectator, to be positioned by the camera above, beside and amid the dancers of Bausch’s Wuppertal troupe is not unlike floating bodiless through more solid phantoms.” And in Herzog’s cave film he felt that “the tremendous sense of movement in these depictions of animals depends on the curvature of the walls of the Chauvet-Pont-d’Arc caves. . . . Together, these [two] films suggest that 3D might find its best uses in bringing real rather than imagined things to us.”<sup>50</sup>

“Bringing real rather than imagined things to us” makes a counterintuitive claim for 3-D, shifting attention from the technological and the archaeological to the aesthetic-perceptual. In a review of *Up*—which was showcased as a trial balloon for 3-D’s art-cinema acceptability at Cannes—Hans-Georg Rodek noted that “soon you forget that it is 3D, the effects are used so sparingly. In other words, the sensationally new technique is entirely subordinated to the logic of the narrative.” The decision struck him as counterproductive, since, as he says, “this is where one’s doubts arise. Because D3D is marketed as a sensation: with the obvious goal of being able to charge higher admission at the box-office. And for that, it needs to be experienced as a sensation. When all you can say is that it blends in with our normal visual habits the special effect is soon special no more.”<sup>51</sup> But herein lies the rub; if one thinks of 3-D not as part of a cinema of attractions, not as startling you or throwing things at you from the depth of space, but as the vanguard of a new cinema of narrative integration, introducing the malleability, scalability, fluidity, or curvature of digital images into audiovisual space—doing away with horizons, suspending vanishing points, seamlessly varying distance, *unchaining* the camera and transporting the observer—then the aesthetic possibilities are by no means limited to telling a silly story, suitable only for kids hungry for superheroes, action toys, or sci-fi fantasies.

In other words, most commentators, discussing 3-D images solely in the context of the theatrical feature film, assume a space and a physical environment where the spectator’s gaze is directed at the vertical screen,

49. For my analysis of *Avatar*, see Elsaesser, “Access for All: *Avatar*,” *New Review of Film and Television Studies* 9 (Sept. 2011): 247–64.

50. Nick James, “Berlin Film Festival—Review,” *The Observer*, 19 Feb. 2011, guardian.co.uk/film/2011/feb/20/berlin-film-festival-review

51. Hans-Georg Rodek, “‘Oben’ beweist—3D ist keine Kino-Sensation,” *Die Welt*, 13 May 2009, welt.de/kultur/article3732236/Oben-beweist-3D-ist-keine-Kino-Sensation.html; my trans.

bounded by a black frame; yet, in the broader scheme of things I am sketching for 3-D, it is this upright, forward orientation that is also challenged, making big screen 3-D a special case, rather than the norm, within the expanded field of stereoscopy and in-depth vision. An altogether more variable array of screens is implicated or envisioned: mobile, held in the palm of the hand or so large that it envelops the entire field of vision, as part of the ambient environment, unframed and configured in any space whatever. In short, 3-D would be symptomatic of the proliferation of screens that we encounter around us, picturing not a particular view, projecting not a particular kind of image, but, instead, producing a particular kind of spectator; to the ideal image without a horizon corresponds the ideal spectator—floating, gliding, or suspended. As already evident in the reference to phantasmagorias (as well as in the comments from *The Observer*), such spatiotemporal re- and dislocations have hitherto been the privilege of ghosts, revenants, and other virtual presences from beyond. Examples from contemporary cinema include Japanese films, where ghosts supply the narrative rationale for exploring three-dimensional space, foremost among them Takeshi Shimizu's *The Shock Labyrinth 3D* (2009). A special case—technically in the 2-D mode but requiring us to imagine curved space or space/time dislocations—is Kim ki-Duk's, *Bin-jip* (2004), whose protagonist wills himself into invisibility by staging para- or pseudostereoscopic situations, as if to intimate that—like a stealth bomber invisible to radar—stereoscopy gives the spectator or user a presence sensed rather than seen, creating coordinates of invisible presence, even in the field of vision.<sup>52</sup>

To this extent, such shifts in time-space perception do not require 3-D rendering, even as they present “imagined things” rather than “bringing real” ones to us. In his attack Ebert, I think, makes the mistake of thinking of 3-D as enhanced realism within Renaissance space, chiding it for being unnatural. Francis Ford Coppola, who worked with the spatiality of sound earlier than most, is not impressed by 3-D so far, reminds us that Abel Gance had already experimented with 3-D.<sup>53</sup> David Bordwell, also rather skeptical of 3-D, has nonetheless made some pertinent observations on his blog.<sup>54</sup> For instance, he notes that in *Coraline* (dir. Henry Selick, 2009) the

52. For a closer examination of *Bin-jip*'s stereo effects, see Elsaesser, “World Cinema: Realism, Evidence, Presence,” in *Realism and the Audiovisual Media*, ed. Lucía Nagib and Cecilia Mello (New York, 2009), pp. 3–19.

53. See Jason Knott, “Francis Ford Coppola: 3D Is ‘Tiresome,’” *Electronic House*, 11 May 2010, [electronichouse.com/article/francis\\_ford\\_coppola\\_3d\\_is\\_tiresome](http://electronichouse.com/article/francis_ford_coppola_3d_is_tiresome)

54. See Bordwell, “*Coraline* Cornered,” 23 Feb. 2009, [davidbordwell.net/blog/2009/02/23/coraline-cornered](http://davidbordwell.net/blog/2009/02/23/coraline-cornered)

animators used 3-D effects, not in order to emphasize depth, but to construct spaces that do not follow the rules of perspective and introduce slight anomalies into it. Artificially *flattening* the picture, they simulate cognitive dissonances and introduce perceptual miscues, generating a subtle sense of claustrophobia or discomfort that transmits the heroine's state of mind to the spectator as a bodily sensation. Bordwell's points draw on the commentary by the director:

I was also looking for what is the difference between the real world and the other world, besides how much depth does it have. . . . I had in my mind why don't we just turn up the 3D in the other world, compared with the real world but why don't we in the real world, especially in the interior shots, in the kitchen, the living room, Coraline's Bedroom, why don't we actually build them as if they were flattened, as if they have very little depth. . . . I wanted her life in the real world to feel as if it were claustrophobic, lacking color, a certain sense of loneliness. We did that. . . . We actually built it [the other world] much deeper. And the 3D shows that off.<sup>55</sup>

In other words, directors and writers, aided in this case by thirty-odd animators and digital designers and, no doubt, abetted by neuropsychologists,<sup>56</sup> are deploying digital 3-D space to affect us, the spectators, not so much by suggesting spatial verisimilitude or depth. Instead, they may use 3-D in order to give a new value to 2-D, either to go retro or to deploy some of the effects available in other systems of spatial representation, be they Asian (Japanese woodcuts), pre-Renaissance (Fra Angelico), borrowed from impressionist painting (Vincent van Gogh),<sup>57</sup> or reminiscent of the frontality of early cinema that I mentioned above. This is the case of Burton's *Alice in Wonderland* (2010) and Scorsese's *Hugo*—reviving representational modes previously repressed or discarded, even when making way for the classical cinema's more narrowly pictorial staging in depth.<sup>58</sup>

55. Quoted in Jesko Jockenhövel, "Der stereoskopische Fimraum: Immersion und Kohärenz in Henry Selick's *Coraline* und Tim Burton's *Alice in Wonderland*," *Rabbit Eye – Zeitschrift für Filmforschung* 2 (Summer 2010): 113.

56. See Kevin Randall, "Rise of Neurocinema: How Hollywood Studios Harness Your Brainwaves to Win Oscars," *Fast Company*, 25 Feb. 2011, [fastcompany.com/1731055/oscars-avator-neurocinema-neuromarketing](http://fastcompany.com/1731055/oscars-avator-neurocinema-neuromarketing)

57. By digitally adjusting contrast, color saturation, and depth of focus, a technique called "tilt-shifting" transforms van Gogh paintings into 3-D simulations; see "Tilt-Shift Van Gogh," *Artcyclopedia*, [artcyclopedia.com/hot/tilt-shift-van-gogh-1.htm](http://artcyclopedia.com/hot/tilt-shift-van-gogh-1.htm). There is even a company for 3-D rendering calling itself Van Gogh Imaging ([vangoghimaging.com](http://vangoghimaging.com)).

58. Thompson has made a preliminary inventory of early cinema references and stylistic echoes in *Hugo*; see Thompson, "HUGO: Scorsese's Birthday Present to Georges Méliès," 7 Dec. 2011, [davidbordwell.net/blog/2011/12/07/hugo-scorseses-birthday-present-to-georges-melies](http://davidbordwell.net/blog/2011/12/07/hugo-scorseses-birthday-present-to-georges-melies)

This suggests the paradoxical conclusion I have already alluded to: given that the new 3-D is not a “return of deep space” in the manner of protruding objects in 1950’s creature features, 3-D’s reemergence is more likely to evolve towards extending the expressive as well as conceptual registers of post-Euclidian space and, thus, may enlarge the scope of perceptual responses, deepen the affective engagement of the spectator, and work towards integrating the originally disruptive effects of stereoptic depth cues with other monocular depth cues, such as resolution, shading, color, and size. Hence, *what is being promoted with 3-D is not a special effect as special effect but as the new default value of digital vision*, presuming a layered, material, yet also mobile and pliable space. It signifies a whole spectrum of stereo sensations for eye and ear, but also the thrills and threats of floating, falling, disorientation, and realignment that we know from blockbuster spectacles and animation films. As the default value of postpictorial spatial vision and in-depth sensation in the digital age, 3-D would be retooling the semantics of embodied perception, as stereo-space becomes the unmarked normal and mono-flatness the new retro (“vinyl”). Stereoscopy would designate, as it seems to have done for Benjamin, less the specificity of a technique of depth perception than to serve as a metaphor or symbolic form. It would correspond to the everywhere and nowhere, the spatialized ubiquity we now inhabit in the day-to-day, giving the lie to the fixed or grounded observer of the single point of view as predicated by the last five hundred years of monocular perspective.<sup>59</sup> If such a reorientation and relocation is indeed taking place, 3-D cinema plays a partial and subordinate role, one symptom or element among many. But if its logic were that of the supplement, then this role would nonetheless be crucial in its very marginality.

### **To Lie and to Act: Operational Images**

The second anecdotal piece of evidence for a cultural shift, indicating that changes are under way, comes from an encounter with a seven-year-old. I was sharing with friends some photos of us all many years ago that I had digitized and put on my laptop. One of their daughters was standing next to me, keen to be part of the scene. But instead of looking at the picture and asking who, when, or where, she took the mouse, pointing the cursor at the picture. When nothing happened, she lost interest even though it happened to be a photo of her parents when they were young—that is, before she was born. In other words, for her generation, pictures on

59. I am referring here to Erwin Panofsky’s groundbreaking study, *Perspective as Symbolic Form*, trans. Christopher S. Wood (New York, 1927).

a computer screen are not something to look at but to *click* at—in the expectation of some action or movement taking place, of being taken to another place or to another picture space. The idea of a digital photo as a window to a view (to contemplate or be a witness to) had for her been replaced by the notion of an image as a passage or a portal, an interface or part of a sequential process—in short, as a cue for action.

How would such a change of default expectation affect our idea of what is an image and what it means to interact, to live in, with, and through images? When considering the return of 3-D within this broader challenge—when no longer focused solely on movies or even on ocular perception—a different, but perhaps complementary, logic becomes apparent. The histories and genealogies of 3-D films as I have briefly reviewed them so far contain one seemingly minor but significant omission: they did not hint at the extent to which 3-D imaging has been used for scientific, military, security, and medical (ultrasound) purposes in the past and continues to be used for such in the present. This is a vast field, one that few historians and even fewer film historians have begun to chart.<sup>60</sup> Once one factors in some of these diverse uses and persistent practices, making them part of the overall development of vision systems and spatial projection, the return of 3-D would reveal that 3-D has never gone away. On the contrary, in different mutations it has been the *basso continuo* accompanying the cinema throughout the twentieth century.<sup>61</sup> It is therefore 3-D's return in mainstream filmmaking and popular entertainment that obliges one to shift attention to the close alliance that has always existed between the entertainment industries and other simulation industries, as well as between media of observation and recording and media of surveillance and control. Paul Virilio's *Logistics of Perception* has made the links between cinema and warfare explicit, and others, notably Tim Lenoir, have written about the military-entertainment

60. Among film historians, Jacques Deslandes—in the first volume of his *Histoire comparée du cinéma*, 2 vols. (Tournai, 1966)—has shown the greatest interest in scientific films, while among historians, one can cite Anthony Michaelis, *Research Films in Biology, Anthropology, Psychology, and Medicine* (New York, 1955). More recent work includes Cray, *Techniques of the Observer* (not specifically about 3-D), Lisa Cartwright, *Screening the Body: Tracing Medicine's Visual Culture* (Minneapolis, 1995), and *Films That Work*, ed. Vinzenz Hediger and Patrick Vonderau (Amsterdam, 2011).

61. The self-declared world expert on 3-D cinema, Ray Zone, does not mention nonentertainment uses in his *Stereoscopic Cinema and the Origins of 3-D Film, 1838–1952*. But a title like “War and Depth” by AMREL (the American Reliance Corporation, specializing in medical, energy, and security computing platforms) or the news item that “Boeing launches compact, energy-efficient 3D imaging camera” reveals the tip of this particular iceberg (Darren Quick, “Boeing Launches Compact, Energy-Efficient 3D Imaging Camera,” *Gizmag*, 11 Mar. 2010, [gizmag.com/boeing-3d-imaging-camera/14489](http://gizmag.com/boeing-3d-imaging-camera/14489)).

complex.<sup>62</sup> Explicitly or implicitly, such studies argue that the technologies of imaging today are not means of assisting sight, whether of real or imagined things, but technologies of probing and penetration. As vision machines, they generate knowledge that has little to do with human perception or seeing, in the sense of “I see” meaning “I know,” and more to do with controlling territory, occupying space, monitoring a situation, and mining it for useful information or active intervention.<sup>63</sup> Some species of technical images may turn out to be useful to humans without being meant for human eyes, so that 3-D images, while deceiving the human eye into perceiving depth where there is none, reveal to machines things that humans can never expect to see.<sup>64</sup>

Another historian-theorist of digital media draws from this one possible conclusion. Lev Manovich has written about the need to reclassify media screens into those that are concerned with telepresence (monitor, video screen) and those with tele-action (radar, touch screens, infrared, laser), a distinction also useful in clarifying what is at stake with 3-D images in the context of their nonentertainment uses. Manovich encourages one to distinguish images not according to truth and fiction or real and imagined things but between simulation (virtual action) and dissimulation (virtual presence) or, as he calls it, between lying and acting.<sup>65</sup> If one future of imaging is to be part of “the combat of surveillance against camouflage,”<sup>66</sup> then behind the return of 3-D in its entertainment, industrial, engineering, design, and military applications lies the more general shift of our culture towards recoding seeing into a form of action. *Avatar* would be

62. See Paul Virilio, *War and Cinema: The Logistics of Perception* (London, 1997), and Tim Lenoir, “All but War Is Simulation: The Military–Entertainment Complex,” *Configurations* 8 (Fall 2000): 289–335.

63. Lenoir’s research group at Duke University piggybacks on the US military’s simulation games in order to train for humanitarian interventions: see “Virtual Peace: The Humanitarianism Assistance Training Simulator,” [virtualpeace.org](http://virtualpeace.org)

64. By 1910, the Lumière brothers had abandoned film and photography and set up a large-scale research laboratory in Lyon in order to study problems in physiology and mechanics of motion and acoustics, using X-ray machines alongside their motion picture camera as scientific instruments. Although Auguste came to consider research in medicine more important than the invention of the cinematograph, there is a logic that unites their work on visualizing physiological processes with their interest in acoustics, color photography, and stereoscopy. See Cartwright, “‘Experiments of Destruction’: Cinematic Inscriptions of Physiology,” *Representations*, no. 40 (Autumn 1992): 129–52, and Bruno Salazard, Christopher Desouches, and Guy Magalon, “Auguste and Louis Lumière, Inventors at the Service of the Suffering,” *European Journal of Plastic Surgery* 28, no. 7 (2006): 441–7.

65. See Lev Manovich, “To Lie and to Act: Cinema and Telepresence,” in *Cinema Futures: Cain, Abel, or Cable? The Screen Arts in the Digital Age*, ed. Elsaesser and Kay Hoffmann (Amsterdam, 1998), pp. 189–99.

66. Manovich, “The Mapping of Space: Perspective, Radar, and 3-D Computer Graphics,” [manovich.net/TEXT/mapping.html](http://manovich.net/TEXT/mapping.html)

a case in point, where simulation becomes indistinguishable from action.<sup>67</sup> Cameron's commercial-military-scientific mission to the planet Pandora is like an inventory of what 3-D software is currently being used and promoted for: computer game environments; unmanned surveillance and combat vehicles; oil exploration and land-surveying; weather prediction, conservation, and environmental politics.<sup>68</sup>

Without here examining these "applications" in detail, it is evident that the nonentertainment uses of 3-D imaging constitute a multifaceted appropriation and mapping of any territory whatsoever—on, above, and below ground, in which physical space, deep space, and virtual space are hybridized and matched, stitched together or played off against one other, giving relief and body to what is visible, while making visible in spatial terms what the human eye is unable to perceive at all. Which by a less circuitous route than one might think brings one back to the origins of the cinema.

Of particular interest is the name of the software, whose versatility I have just cited: Fledermaus, which at first made me think, rather incongruously, of the operetta. On second thought, however, the pun is an important clue, insofar as the (originally Danish) company had used the German word for "bat," hinting once more at the fact that 3-D graphics and software have less to do with sight than with any sensory apprehension of space, considering that bats orient themselves in space and plot their trajectory via high-frequency sound rather than sight.<sup>69</sup>

### Enlarging the Cast of Actors, Interacting

To what extent, then, are stereoscopic or expanded 3-D technologies about vision rather than belonging to a register where seeing, sensing, probing, and acting become merged, blurred, and hybridized? For more

67. 3-D images belong to this new kind of image: not to lie with (illusion) but to act with (telepresence). The abstraction, which is monocular perspective projection—the window on the world (the meaning of the Latin *perspectiva* is "to see through")—is replaced by another abstraction, that of the game: focused on and defined around action. Both *interactive* and *immersive* are hybrid terms that do not accurately describe this new definition of the image as operational and instrumental, comprising an array of instructions and visual cues for action.

68. A similar list is presented by an Australian company, which proudly asks: "what can K2Vi do for you?" and answers: "Property Development," "Resource/Planning Consents," "Tourism," "Military Applications," "Landscape Design," "Town Planning," "Civil Engineering" ("K2Vi," AAM, [aamgroup.com/products/k2vi.cfm](http://aamgroup.com/products/k2vi.cfm)).

69. Fledermaus is a 3-D interactive visualization system (IVS 3dD), which "enables commercial, academic and military clients mapping the oceans to interact with massive geographical datasets of numerous data types" ("Fledermaus Suite," [ivs3d.co.uk/companyinfo/about\\_ivs.html](http://ivs3d.co.uk/companyinfo/about_ivs.html)). Having been acquired in 2011 by the Dutch software company QPS (Quality Positioning Services), it has expanded into what it calls "a true 4D space and time environment" ("Fledermaus," [qps.nl/display/fledermaus/main](http://qps.nl/display/fledermaus/main)).

than two decades Harun Farocki has been excavating the industrial, scientific, institutional, and military uses of images simulating depth and action at a distance, while tracing their transformation from images as views to be seen to images as sources of information to be scanned, classified, and acted upon. In titles that range from *Images of the World and Inscription of War* (1989) to *Eye/Machine* (2001–2003) and from *I Thought I Was Seeing Convicts* (2000) to *Deep Play* (2008), Farocki has deconstructed and analyzed, as well as historically contextualized, these images on the cusp of seeing and acting, calling them operational images.<sup>70</sup> These include the use of stereometric photography in nineteenth-century architecture and land-surveying, photoreconnaissance flights over Auschwitz by the US Air Force in 1944, surveillance footage from security prisons and supermarkets, time and motion studies in factories, as well as the 2008 football World Cup final in Berlin, as tracked by sensors and vision machines. In many of these cases, images are not something to be contemplated, to immerse oneself in, to be looked at either with admiration or disinterest, but sets of instructions for action or sets of data for processing and translating into actions.<sup>71</sup>

The brief reference to Farocki's work allows me to summarize what I have been arguing: three-dimensional images (or spatial perception through mechanical means) have been important and continue to be so under different but interrelated aspects.

First, the desire to give spatial volume and body to projected light seems to have preceded the flat cinema screen, to have been modeled on the framed view of painting and simulating depth mainly through recession and scale. In which case, the emergence of 3-D imaging is indeed a return of sorts, one that returns the fixed spectator facing the fixed rectangular screen to being a historically contingent actor in a transitional but necessary arrangement in an ongoing transformational process, whose overall logic may yet escape us. This is why it cannot be pressed into either a normative state or a teleological path.

The second point concerns my extended reading of stereoscopic imaging, where 3-D paradoxically symbolizes the variable properties, uses, and surfaces of what we still call screens, at the same time as it does away with the level horizon, the fixed point of view. It inaugurates instead a floating presence, immaterial and invisible as well as ubiquitous and omnipresent,

70. Operational images are discussed in Christa Blümlinger, "Harun Farocki: Critical Strategies," trans. Sally Laruelle, in *Harun Farocki: Working on the Sight-Lines*, ed. Elsaesser (Amsterdam, 2004), pp. 318–20.

71. On Farocki's installations, see also *Harun Farocki: Against What? Against Whom?* ed. Antje Ehmann and Kodwo Eshun (Cologne, 2010).

no less a formalized illusion as was linear-monocular perspective when it pretended that the earth was flat and man was the only creature that mattered in the eyes of God. Now the illusion of ubiquity, simultaneity, and omnipresence compensates for being a mere speck in the universe, enmeshed in networks of plotted coordinates, trackable and traceable at every point in space or time and yet suspended in an undulating, mobile, variable inside, to which an outside no longer corresponds, however vast, connected, or proliferating such an inside—now called being online—promises to be.

My last point concerns the actors and agents involved, among whom (apart from spectators) I have highlighted three principal players: Hollywood and the entertainment industries, the avant-gardes and utopians of obsolescence, and the military-industrial users of visualized-virtualized space. In each case, I have tried to identify their main concerns, which I cast in counterintuitive or alternative storylines. As far as Hollywood goes, D3D is not treated as a special effect but as a means towards integration and a resetting of default values; its vigorous promotion is not a panic reaction but part of a push towards integrating all platforms and screens, big and small, fixed and mobile. And in contrast to widespread assumptions, it functions as a complement of our sound spaces rather than as an enhancement of realist image spaces.

With respect to the avant-gardes, these have consistently challenged the hegemony of Renaissance perspective, in modern times from Turner to Jacobs, via cubo-futurism, dada, and surrealism. However, since the mid-twentieth century, sculpture and performance rather than photography and painting have been the driving force behind time-based stereo spaces. The poetics of obsolescence, in the meantime, have kept alive alternative genealogies of the cinema, going back to phantasmagoria and bypassing photography, and thus promising a possible future for cinema—as installation art, digital cinema, as *image into space and space into image*.

The military-industrial users of 3-D (but also the generation of gamers), finally, are redefining what an image is—not a representation to look at but a set of instructions to act on/to act with. In this context, stereo or 3-D includes sound, sonar, and spatial mapping of data, as well as the use of the moving image as a time index; here, too, vision is secondary to other sources of input. Given the emphasis on controlling and occupying territory, 3-D becomes an integral part of the surveillance paradigm, if we understand this not as observing, witnessing, or contemplating but as probing and penetrating, processing and possessing.

Surprisingly then, in light of their different histories and ideologies, the actors involved in the return of 3-D have a number of similar concerns and

agendas, whose common denominators would seem to be the obsolescence of film-based photography, the historical contingency of monocular spatial projection, and the recovery of stereo space as a multivariable, non-ocular spatiotemporal (dis-)orientation. Taken together, the cultural, political, and technological significance of this reorientation may coalesce around a new symbolic form, one that has not yet received an agreed upon terminology, since it encompasses such diverse phenomena or concepts as surveillance, omnipresence, process and becoming, relational aesthetics, immanence, and virtuality. Wholly *inside* its various manifestations, it is difficult to think of it as a coherent field. Yet in order to understand the degree of our collusion and participation, we have to keep in mind—and perhaps to keep in check—all of the actors involved. Accustomed as we are to the artistic avant-garde as resistant to all commercial applications (which usually includes the Hollywood film industry), we tend to regard scientific inquiry as pure, technology as instrumental, and the military-industrial complex as immoral. What the return of 3-D shows is how difficult it is to maintain such neat distinctions. One needs to think creatively as well as critically about their entanglement, which has been oppositional, interdependent, and cooperative-complicit all at the same time. Perhaps the reason why Hugo, clutching his father's robot and snatched by the stationmaster from the tracks of the digitally onrushing train, yields such a memorable 3-D image is because its several dimensions hint at just such an improbable but necessary constellation of antagonistic mutuality.