# IN FOCUS: Screen Technologies

## Introduction

by Haidee Wasson, editor

In the midst of cinema's significant technological and industrial changes of the late 1920s, Sergei Eisenstein delivered a speech to the American film industry.[1] In his address, he advocated a new standard shape for the film screen. A different screen ratio than the one then common would better suit cinema's unique capacities, he claimed. Rather than support the continuation of the American industry standard, which he referred to as "the static rectangle," Eisenstein playfully hyped the virtues of the "dynamic square," a screen that was exactly as high as it was wide. He did so in part because to him the square was modern, charged with productive machine force. This more purely cinematic screen was, according to Eisenstein, necessary for properly showcasing the energies, conflicts, and collisions germane to the moving image arts. It would also, at least in theory, be the most accommodating frame, capable of hosting images composed for planes that were both horizontal and vertical. Eisenstein proclaimed that previous industry standards (4:3), as well as contemporaneous calls for wider screens, were nostalgic, calling forth a dated viewing regime dictated by traditional art forms. Cinema deserved something better and more specific, a screen that could best accommodate its rapidly developing languages and its expanding sociopolitical functions.

In advocating for the dynamic square, Eisenstein confronted the intense technological standardization required for the growing empire of screens, though he sought not to entirely dismantle it, but merely to influence its directions. His call to engage the question of screen dimensions came during a period of intense discussions about technologies of cinema more generally. With the rise of synchronized sound and the media convergences that characterized this period, the whole apparatus of cinema was being unsettled and rearranged. If cinema's

1 Sergei Eisenstein, "The Dynamic Square," in *Film Essays and a Lecture*, ed. Jay Leyda (New York: Praeger, 1970), 48–65.

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08 InFocus_143-174_CJ_51-2 cs3.indd 143 11/15/11 8:11:57 PM

sounds were to become electrical and its spaces highly acoustic, why couldn't its screen also adapt and transform? And, of course, it did.

We know from Anne Friedberg's wonderful book *The Virtual Window* that Eisenstein was not entirely alone in his meditations on the film screen.[2] Following her we can observe a persistently transforming screen—Cinerama, drive-ins, and multisurface installation works—which reminds us that even this one piece of the complex technological puzzle that we call "cinema" has not uniformly marched through history, blandly reflecting a singular or simple cinematic ideal. Rather, the film screen has long functioned as a productive technology and site, actively shaping the ways in which all variety of films have been made, presented, and viewed, and then recirculated, presented, and viewed again. Discussions about screen size, shape, reflectivity, and function are a persistent thread throughout the twentieth century, long explored by theorists and critics, but also by a tremendous number of engineers, filmmakers, entrepreneurs, institutional authorities, hobbyists, and consumers.

This In Focus charts an emergent thread in film and media research, one that seeks to open up our understanding of cinema's past, in part by breaking apart the idea of a singular technological apparatus. The essays here are written by scholars working across conventional fields of film and media study: industry, special effects and 3-D, technology, exhibition, film institutions, experimental film, and sound. Yet each contribution is linked by a commitment to highlighting the screen as but one persistent element of cinema's complex and multifaceted legacy. Each demonstrates that in the digital age, when screens link phones, cameras, televisions, and cinema into an expanded network of display, the film screen, with its seemingly quaint use of projected light, amplified sound, and spatial magnitude, still has something to tell us. The history of the film screen helps to expand histories of cinema; such histories make a case for coming to grips with cinema's long-standing and persistent links to other media forms, to varied audiences, and to a surprising functional diversity. For these authors, the film screen has long been defiantly dynamic. The fact of this dynamic screen improves our understanding of cinema's place in media cultures past and present.

The essays collected here consider the film screen in its varied permutations throughout the twentieth century. Some authors examine a generalizable film screen, others a particular film screen, with a cluster of essays addressing the American film screen at midcentury, though, it should be said, the questions raised are not necessarily specific to the United States or to this historical period and, indeed, resonate with research being done in other national contexts and other time periods.[3] All authors address, to varying degrees, the history of the film screen, doing so with select case studies of live-performance screens, portable screens, domestic screens, experimental screens, and production screens. Screens here are not just sites of automatic or professionalized film performance, exhibition, and display; rather, they are multimedia sites incorporating aesthetic, improvisational, adaptive, and creative practices. These essays

2 Anne Friedberg, *The Virtual Window: From Alberti to Microsoft* (Cambridge, MA: MIT Press, 2006).

3 See, e.g., Vinzenz Hediger and Patrick Vonderau, eds., *Films That Work: The Industrial Productivity of Media* (Amsterdam: University of Amsterdam Press, 2009); and Brian Larkin, *Signal and Noise: Media, Infrastructure and Urban Culture in Nigeria* (Durham, NC: Duke University Press, 2008).



08 InFocus_143-174_CJ_51-2 cs3.indd 144 11/15/11 8:11:57 PM

supplement existing work on the theatrical screen, inviting readers to consider cinema in its expanded locations, those "beyond the multiplex," to borrow a phrase from Barbara Klinger.[4] The authors ask us to embrace the dynamics of the film screen as it has long existed, and to consider its supporting cast of integral, cognate technologies.

Complicating the entry points and the methods by which we wade into discussions about what cinema has been and continues to be, the essays show that film is productively understood as a family of technologies, an assemblage of things and systems that are multiply articulated across its history and its contexts. The film screen is but one part of this shifting assemblage, a telling portal to a range of creative languages, modes of performance and display, contexts of exhibition, and audience formations. Cognate technologies are also key to screen history. For instance, looking at small screens, as Steve Wurtzler and I do, quickly demonstrates the enduring links of consumer film projection technologies to an array of other gadgets: record players, microphones, speakers, and so on. A history of small film technologies, whether in the home or in an institutional setting, necessarily raises new questions about provisional contexts of film presentation, the convergence of exhibition ideals with the contingencies of everyday performance, and the unusual sites for thinking about a cinema predicated on machines designed to be used not by a professionalized entertainment industry but by those more attuned to turning knobs and pushing buttons. While film projectors surely transformed public entertainment, they also transformed personal expression, augmenting the expressive capacities of the human body through projected light and amplified sounds.

Tess Takahashi and Julie Turnock's case studies help us to think about screens as a way to think about what an image is. Takahashi calls for reexamining the history of American experimental film as a creative movement deeply committed to integrating screens, spaces, and audiences into a new kind of film art, one that was live and unfolding around and through the screened image. This new art was not solely dedicated to film's specificity or to an unchanging idea about a modernist language. Rather, Takahashi emphasizes the deeply intermedial play of the film artist. Working toward a history of "display and circulation" helps to improve our understanding of difficult works, she suggests, allowing that sometimes we are looking in the wrong places to understand what we see. Turnock examines a long-standing practice of the American film industry: rear projection as special effect. For Turnock, the technique points to the ways in which the classical realist text has seams, making the image into a composite, sewn together not just by technical practices but by very particular and sometimes counterintuitive aesthetic imperatives. For both Takahashi and Turnock, screens are not incidental aspects of the show but constitutive elements of the very contours of the image and its event.

While the four essays that constitute the middle of this dossier (my own, as well as those by Wurtzler, Turnock, and Takahashi) examine particular screens at particular moments, the dossier is framed by two deliberately polemical and agenda-setting pieces. In the first, Erkki Huhtamo, a scholar who has long argued for the necessity

4 Barbara Klinger, *Beyond the Multiplex: Cinema, New Technologies, and the Home* (Berkeley: University of California Press, 2006).



08 InFocus_143-174_CJ_51-2 cs3.indd 145 11/15/11 8:11:57 PM

of Screen Studies, considers the relationship of the film screen to eighteenth- and nineteenth-century practices involving light and sound, moving pictures, and changing audioscapes. Huhtamo's archeological approach opens up the history of the film screen to lively, hybrid cultural forms that were public and private, live and recorded, impromptu and scripted. Huhtamo continues his call for a complex and nimble set of tools to account for the variety of moving pictures and their presentation contexts. A history of touch, he declares, is inevitably next.

The final essay is by Charles Acland, who begins with Marshall McLuhan and ends with Roland Barthes, unlikely partners. He does so in order to work through some general questions: What is a screen? Why should we study it? For Acland, screens are, at their most basic, "surfaces for animation." But they are brought to life by a stunning array of tendencies and technologies. Acland argues that our examination of such things must always be informed by attention to the ways in which technologies are constituted, never forgetting the realities of a "messy humanity," one subject to organic sensibilities that defy systematization. Equally important are the persistent hierarchies of value that seek to impose order on all practices, including screen practices.

Collectively, these authors address film screens big and small, old and new, concealed and apparent. Such screens have shaped exhibition venues public and private, with audiences of many and of one. While each of these essays approaches the screen somewhat differently, in order to achieve different ends, all demonstrate that the screen itself is a productive entry point into questioning the theory (or the metaphor, if you will) of a singular "cinematic apparatus." The goal is to complicate cinema now and throughout history, presupposing that the term "cinema" designates not a singular articulation but a multiple and changing one. The challenge is considerable. The more we look back, the more dynamic the screen seems to become. ✻

# Screen Tests: Why Do We Need an Archaeology of the Screen?

by Erkki Huhtamo

Some years ago I began an article calling for "screenology" with what sounds like a blatant truism: "An increasing part of our daily lives is spent staring at screens."[1] Surely everyone knows that—at least everyone living in the highly mediatized and technologized parts of the world. What many don't know is that they know. How often do users of smart phones think about the curious shifts of perception between nothing less than ontological realms that take place when they move their gaze from the screen to other humans, to the surrounding landscape, to another screen, and back again, in rapid succession?



08 InFocus_143-174_CJ_51-2 cs3.indd 146 11/15/11 8:11:57 PM

As they become part of the practices of everyday life, screens have a tendency to become invisible; they mediate perceptions and interactions, effacing their own identities in the process. We don't stare at the screen; we gaze at what it transmits. But there is more: screens also hide the history of their own becoming, turning into a kind of ever-present nonpresence, an anomalous object.

This is one of the reasons why I have been calling for screenology, a hypothetical branch of Media Studies that would focus not "only on screens as designed artifacts, but also on their uses, their intermedial relations with other cultural forms and on the discourses that have enveloped them in different times and places."[2] Screenology, or an archaeology of the screen, is needed to make screens visible again—to frame them, so to speak—and to break the illusion of timelessness, of media without history, that they sustain.

Figure 1. *Écran panoramas*, or panorama hand screens, were produced in France in the 1820s and 1830s and were used as handheld fire screens; they also contained translucent images (from the author's collection).

An obvious way to start is by tracing etymologies and early trajectories. Objects identified as screens in the past have not always functioned as the screens of today. Huge varieties of decorated "fire screens" were produced to guard humans from heat or light or gaze; an interplay between hiding and revealing came about as display screens gradually developed. "Mechanical" or "panorama" screens were produced in France in the 1820s and 1830s (Figure 1). They could be used as handheld fire screens, but they also contained translucent images—sometimes long rolls of them—that could be manipulated by the user; this distanced them from the "proto-screens" of the past and pointed toward new uses and definitions within what we now call "media culture."

In the reverse case, there have been cultural objects that have not been identified as screens, but have nevertheless functioned as surfaces for retrieving and transmitting visual information. The famous "special effect" Nostradamus is said to have concocted—a vision in a mirror of the future kings of France, which he displayed to the concerned queen Catherine de' Medici—is a famous example of "magic media." (How the trick was produced is still under debate.)[3] The enchanted mirrors in Jean Cocteau's *Beauty and the Beast* (*La belle et la bête*; 1946) belong to the same trajectory, as do the mirrors that metaphorically mediate between different realms of being in his *The Blood of a Poet* (*Le sang d'un poète*; 1930) and *Orphée* (1950).

1 Erkki Huhtamo, "Elements of Screenology: Toward an Archaeology of the Screen," *ICONICS: International Studies of the Modern Image* 7 (2004): 31–82.

2 Ibid., 32.

3 Jurgis Baltrusaitis, *Le miroir: Révélations, science-fiction et fallacies* (Paris: Elmayan / Le Seuil, 1978), 184–187, 206–208.



08 InFocus_143-174_CJ_51-2 cs3.indd 147 11/15/11 8:11:57 PM

A useful opening toward developing an archaeology of the screen was Charles Musser's concept of the "history of screen practice," introduced in 1984.[4] Musser suggested the idea of cinema "as a continuation and transformation of magic lantern traditions in which showmen displayed images on a screen, accompanying them with voice, music, and sound effects."[5] The entire first chapter of Musser's *The Emergence of Cinema* was dedicated to forms that preceded the appearance of "modern motion pictures."[6] Musser traced the history of screen practice to the seventeenth century, in particular to the influence of the Jesuit polymath Athanasius Kircher (1602–1680). Although Kircher could not be credited as the inventor of the magic lantern (an honor assigned to the Dutch scientist Christiaan Huygens), he was, according to Musser, engaged in the "demystification of the projected image."[7]

In comparing Kircher's parastatic microscope, a handheld viewing device for peeping at images painted on a rotary glass disc, with the magic lantern, Musser made a very important point: "The two instruments shared many elements—including subject matter—but had distinctive qualities as well. One encouraged collective viewing, the other private spectatorship and voyeuristic satisfaction. These two ways of seeing images were to produce closely related, overlapping practices that paralleled each other throughout the period covered by this volume [up to 1907]."[8] Thus, since the seventeenth century the history of projected images has been accompanied by another trajectory based on peeping at them through lenses. I have proposed to call it the "history of peep practice."[9] Obviously we are not dealing with screens here, at least not in the familiar sense of slide and film projections. The situation becomes even more complicated if we start admitting other "screenlike" phenomena and situations into the discussion. What should we do with a phenomenon like the moving panorama, which was related to magic lantern shows by many complex threads and purportedly influenced early film culture as well?[10]

The moving panorama used neither projection nor screen per se; it was a very long painting—a premarked material surface—that was mechanically unrolled in front of an audience across a kind of presentation window. If we define the screen as a blank surface to be filled with visual information by means of luminous projection, the moving panorama show obviously does not qualify as a screen practice (although the painting *did* become a "screen" for rear-projected "dioramic" light effects). However, if we take into consideration the presentation apparatus and ponder how it was activated in actual performances, the situation must be understood differently.

4 Charles Musser, "Toward a History of Screen Practice," *Quarterly Review of Film Studies* 9, no. 1 (Winter 1984): 59–69.

5 Ibid., 59.

6 Charles Musser, *The Emergence of Cinema: The American Screen to 1907* (Berkeley: University of California Press, 1990), 55.

7 Ibid., 19.

8 Ibid., 22.

9 Erkki Huhtamo, "Toward a History of Peep Practice," in *A Companion to Early Cinema*, ed. André Gaudreault, Nicolas Dulac, and Santiago Hidalgo (Oxford: John Wiley, forthcoming 2012).

10 See Erkki Huhtamo, *Illusions in Motion: A Media Archaeology of the Moving Panorama and Related Spectacles* (Cambridge, MA: MIT Press, forthcoming 2012).



08 InFocus_143-174_CJ_51-2 cs3.indd 148 11/15/11 8:11:57 PM

From such a perspective, the magic lantern show, the moving panorama show, and the early moving picture show had much in common: the audience sat facing the presentation, a lecturer explained the pictures, live music and sound effects accompanied the show, and so on.

The age-old tradition of shadow theater uses projections on a screen, albeit technically simple ones. Shouldn't it be part of the history of screen practice? Indeed, isn't shadow theater its oldest ur-form? I think so, although the influence that *ombres chinoises* —performed in public places and private nurseries alike—exerted on film culture was not direct or obvious. Although it was not a decisive factor in the advent of film, it was certainly part of the complex of factors. The famous "ombroman" Félicién Trevey, who used only his hands to project amazing scenes on a screen, obviously grasped the connection, becoming a manager for the Lumière brothers.[11]

Figure 2. *Le chanteur en foire (Bänkelsänger)*, a 1766 engraving by Romanet from a painting by J. C. Seekaz, points to another avenue of exploration for "screenology" (from the author's collection).

There are more complicated cases to include in our archaeology of the screen. The *Bänkelsang* is one of them. It was once a popular form of visual storytelling—like the shadow theater and the moving panorama—but it has been largely neglected by media historians, perhaps because of its lack of "media technology."[12] Widely known in Europe from the seventeenth century, the *Bänkelsänger* (bench singer, or *chanteur en foire*) was a wandering entertainer-newscaster, whom numerous illustrations depict standing on a scaffold, pointing at a large sheet of pictures, and interpreting them with songs and stories (Figure 2). The presentations combined current affairs with sensationalist and moralistic accounts of catastrophes, wars, murders, illicit love affairs, and so on. Musical accompaniment was often provided, and the singer's companions—often his wife and children—sold song broadsides for a living.[13]

It could be argued that because of the arrangement of its "apparatus," the *Bänkelsang* deserves to be associated with the history of screen practice, and perhaps included

11 See Jac Remise, Pascale Remise, and Regis van de Valle, *Magie lumineuse du théâtre d'ombres à la lanterne magique* (Tours, France: Balland, 1979), 294–301.

12 Friedrich von Zglinicki's *Der Weg des Films: Textband* (Hildesheim, Germany: Olms Presse, 1979) is one of the few works on visual media dealing with *Bänkelsang*. The alternative title, *Moritatensänger*, refers to murders and other gruesome events as subject matter.

13 Song broadsides sold by traveling peddlers were popular already in the sixteenth century, made possible by the Gutenberg printing press.



08 InFocus_143-174_CJ_51-2 cs3.indd 149 11/15/11 8:11:57 PM

in it. And how about "lightning sketches," live performances in which a master draughtsman surprised the audience with amazing drawings that kept transforming as if by magic?[14] The presentation medium was the blackboard, the standard accessory of any schoolhouse. However, it functioned as a screen that was highly "interactive." I have mentioned these random examples to show that defining either "screen" or "screen practice" is anything but self-evident.

To take further steps toward screenology, we must do more research on all these apparatuses, their relationships, and the discursive manifestations they have evoked along the way. To accomplish this, we need excavations that penetrate beyond the obvious and the seemingly clearly delineated. Last but not least, we must abandon received definitions and categorizations of what constitutes a screen. To complicate things further, analyzing screens and screen practices will very probably not be enough to account for the incredible variety of moving pictures and their presentation contexts. It may be necessary to identify related and overlapping practices, including what I have tentatively called "touch practice."[15] In sum, considering film screens, television screens, or mobile phone screens in isolation is not enough; we have to understand their interrelationships and the processes of their mutual becoming. *

14 Donald Crafton, *Before Mickey: The Animated Film, 1898–1928* (Cambridge, MA: MIT Press, 1984), 49–57. As Crafton shows, lightning sketches influenced early trick film.

15 See Erkki Huhtamo, "Natural Magic: A Short Cultural History of Moving Images," in *The Routledge Companion to Film History*, ed. William Guynn (Oxon, UK: Routledge, 2010), 3–15; Huhtamo, "Twin-Touch-Test-Redux: Media Archaeological Approach to Art, Interactivity, and Tactility," in *MediaArtHistories*, ed. Oliver Grau (Cambridge, MA: MIT Press, 2006), 71–101; Huhtamo, "'Shaken Hands with Statues . . .': On Art, Interactivity and Tactility," in *Second Natures: Faculty Exhibition of the UCLA Design / Media Arts Department*, ed. Christiane Paul (Los Angeles: Regents of the University of California, 2006), 17–21.

# Suitcase Cinema

by Haidee Wasson

When did the film screen grow a handle? In 1939, the Victor Animatograph Company announced a new 16mm film projector, the Victor 40, also known as the "Add-a-Unit." Sold from 1939 to 1947, the machine espoused a devout multimedia modularity (Figures 1 and 2). The Add-a-Unit could be purchased with a range of lenses, a record player, a radio, a microphone, a public address system, a sound recording unit, multiple speakers, and an auxiliary amplifying unit. The Add-a-Unit invited users to create their own live or recorded soundtracks. It allowed them to turn the volume up or down, to make the image bigger or smaller. The projector had the ability to play at different speeds and to be stopped, in order to project a single film frame in suspended form. Thus, the user



08 InFocus_143-174_CJ_51-2 cs3.indd 150 11/15/11 8:11:58 PM

exercised a degree of control over key vectors of cinema such as size, speed, volume, illumination, and image density. The Add-a-Unit was presumed—as a projector proper—to be incomplete, sold as it was to be attached to other related media. Also key to completing this particular device was a portable screen, perched opposite the projector, providing the necessary stage for any show. Throughout this period, portable screens and projectors often came in cases integral to their design. A sturdy handle allowed each to be carried with ease.

As when clocks were first attached to wristbands and cassette players to belt clips, the handle of the projector and screen indicates a shift in technological articulation. In the case of this portable pair, there is a rebuff to the professionalized, purpose-built theater and an embrace of the load-bearing, ambulatory human body. The Add-a-Unit, like many portable projectors from this period, was designed to be carried by a single person. It came with finger-friendly knobs and buttons, inviting manipulation, tinkering, and a degree of agency over projected images and amplified sounds. These projectors allowed any person to become a film projectionist, a human-machine hybrid purveying electro-mechanical, audiovisual expression.

Figures 1 and 2. The Victor 40, or "Add-a-Unit," was a multimedia projector that connected to an array of cognate media devices. It was sold from 1939 to 1947 by the Victor Animatograph Corporation, Davenport, Iowa (Papers of the Victor Animatograph Company, Special Collections Department, University of Iowa).

The current variety of lightweight moving-image cameras, rapid-fire distribution methods, and pocket-size display gadgets is often understood by invoking the enduring sense that before video, and most certainly before the rise of the digital, the technological apparatus that constituted moving pictures was relatively stable, coherent, and unchanged from its nineteenth-century beginnings. To be sure, the so-called early and silent periods of film history have been complicated by recent scholarship that posits hybridity in film form and theatrical presentation, with its relations to varied spaces, industries, and audiences. The transition to synch-sound cinema has been plainly revealed as an intermedial one.[1] Yet, with few exceptions, there remains an overdetermined narrative of a dominant cinematic ideal that endured throughout the midcentury: large and dark room, celluloid, projector, screen, seated audience—in short, the movie theater.

1 On early cinema, see Rick Altman, *Silent Film Sound* (New York: Columbia University Press, 2004). On the transition to sound, see Donald Crafton, *The Talkies: American Cinema's Transition to Sound, 1926–1931* (New York: Scribner, 1997). On exceptions to the assumed coherence of cinema's technological apparatus, see Charles Acland, "Curtains, Carts and the Mobile Screen," *Screen* 50, no. 1 (Spring 2009): 148–166.



08 InFocus_143-174_CJ_51-2 cs3.indd 151 11/15/11 8:11:58 PM

The history of portable projectors and the small screens that accompanied them tells the story of a very different kind of cinema from the one we are accustomed to discussing, researching, and theorizing. This is a story of a cinema that readily complicates ideas about a stable cinematic apparatus, providing insight into the variations of design, function, and use that have long characterized but one branch of cinema's technological family tree. In our current media environment saturated with the language of *mobility*, the concept of *portability* sounds familiar but also rather quaint. The term, which essentially names the quality of a thing that can be moved, has a complicated genealogy. It has been applied throughout the twentieth century to seemingly huge and permanent things like buildings (e.g., mail-order homes) and to seemingly immaterial and ephemeral things like music. In the context of cinema, the term *portability* indexes a particular kind of movement.

We know that portability in its most general sense was a foundational characteristic of cinema's earliest days, as Charles Musser and others have shown through histories of screen practice, and also of itinerance.[2] Yet, the term's definition evolved significantly as what was once a fly-by-night technocultural phenomenon settled into what we now understand as the institutions of cinema. So, for instance, it was only a little more than a year after the Society for Motion Picture Engineers (SMPE) formed in 1916 that elements of its membership began lobbying for standardizing a definition of "portability," forged in the context of the movie theater's bold ascendance. At this time, portability entailed a discussion about lightness of weight and sufficient image quality and size, but these issues were subordinate to the challenge of flammability. In other words, during this phase of cinema's history, portability meant, in part, possessing the quality of not catching fire. The idea of a portable projection booth—required for non-theater-based shows in municipalities such as New York City—neatly embodies this.[3] In 1918, when Alexander Victor implored the SMPE to formalize the conditions in which portability would thrive, he joked that "no user could consistently arrive at the place of entertainment, carrying in one hand a truly portable projector, weighing about twenty-five pounds; but in the other hand, a fire-proof booth, weighing five hundred and fifty pounds."[4] Flammability wasn't only about fire but also about the resulting heft—physical but also regulatory—designed to reduce its threat. Moreover, the projector itself proposed a kind of Faustian bargain: the smaller it became, the hotter it got when running. The combustible chemistry of illuminating silver nitrate film stock using a tight, enclosed metal box seriously hindered development of a nimble, lightweight machine.

The long-standing efforts to standardize a nonflammable and smaller gauge of celluloid served to focus the technological innovation of portable projectors and to speed development of a more rationalized and expansive market. It was in this context that Eastman Kodak introduced a 16mm system in 1923, in part to provide a complement to the dominant theatrical and flammable 35mm format, and in part to compete with

2 Charles Musser, *The Emergence of Cinema: The American Screen to 1907* (New York: Scribner, 1990).

3 See *Regulations for Construction and Use of Portable Motion Picture Booths* (New York: Bureau of Fire Prevention, 1915).

4 See Victor F. Alexander, "The Portable Projector: Its Present Status and Needs," *Transactions of the Society of Motion Picture Engineers* 6 (April 1918): 29–32.



08 InFocus_143-174_CJ_51-2 cs3.indd 152 11/15/11 8:11:58 PM

Pathé's smaller, nonflammable 28mm and 9.5mm systems. Shortly thereafter, in the United States and Canada, the 16mm gauge, along with the 8mm gauge introduced in 1932, became the two dominant (though not the only) nonflammable, portable gauges.[5]

Concurrent with the standardization of the 16mm system, the ideal of the purpose-built movie theater had taken on grand proportions. Only months before Kodak's announcement, Sam Rothafel extolled the theater of the future: the gargantuan, technologically sophisticated "atmospheric theater," a picture palace of saturated color and all-encompassing reflective surfaces.[6] Yet, not everyone shared Rothafel's vision. A chorus of other showmen, engineers, and technology manufacturers (including Kodak) scrambled to counter his visions, advocating instead the importance of a simple-to-operate, highly adaptable projector, distinct from the increasingly expensive, professionalized, and complicated theater. Many felt that the high-tech, permanent theater was a hindrance to cinema because it restricted the further development of its forms and functions, preventing it from competing with more nimble media such as newspapers, books, and phonographs.

With the picture palace as backdrop, the portable projector, then, announced a form of cinema that was do-it-yourself and bare-bones by comparison. It fit in a box and could be carried like a briefcase, easily passed off from one person to another. Portable projectors were consistently sold with claims that they were easy to operate. They had names like the "Envoy," the "Lite-Weight," and the "Escort." The projector's capacity to be moved from one location to another, or even just one room to another, was consistently linked in advertising, design, and engineering discourses to the scale of the human body and its capacity to bear weight, to move, and to master things. No longer an expert hidden away behind a theatrical apparatus, the new projectionist was a lay impresario, a performer of moving images, who blended expressive creativity (like playing an instrument) with mastery of mechanical automation (push-button content). This idea of human agency served an industrial, business, and sales force constantly in search of new efficiencies and new modes of persuasion. For instance, in the late 1920s, Kodak marketed the Business Kodascope, designed to be carried by a traveling salesman. The Business Kodascope, which worked using a rear-projection system, turned any desk or small table into a site of moving-image display.

Other aspects of the projector signaled its portability by way of announcing adaptability. Multiple lenses and different bulb wattages allowed for use of the same projector in big or small rooms, and also allowed for some degree of flexibility in projector placement, close to or far from the screen, deep into the audience or far away from it. One of Kodak's sales slogans was "Tailor Made Projection," invoking the idea of a kind of artisanal fit, a personalized match between device and individual measures.[7] Strong or weak light throw designed for differently sized rooms and audiences also entailed a surprising range of screen sizes, in part building on screen practices linked

5 It is worth noting that well beyond this period manufacturers marketed 35mm projectors as "portable."

6 S. L. Rothafel, "The Motion Picture Theatre of the Future and the Equipment Probably Required," *Transactions of the Society of Motion Picture E* 14 (May 1922): 100–103.

7 Kodak used this campaign for its Kodascope L, sold from 1934 to 1938. See, e.g., *Eastman 8mm and 16mm Home Movie Equipment* (catalog), 1937.



08 InFocus_143-174_CJ_51-2 cs3.indd 153 11/15/11 8:11:58 PM

to earlier optical devices. Screens could be placed on tabletops, attached to freestanding tripods, mounted on walls, or hung from ceilings. They could be permanently affixed to a wall and concealed by tapestries or curtains. Some collapsed or rolled up and could be stored away discretely in a closet. Others retracted into furniture. These screens ranged in size from less than twelve inches to as large as twelve feet. The Chicago-based Da-Lite Screen Company, still in operation, marketed fifteen distinct and separate models in the "portable screen family." They claimed fifty standard sizes as early as 1934.[8] Screens were selected according to the room they were to occupy, the power of the projector bulb used, the shape of the seating area to be occupied by the audience, and storage requirements. In other words, screen size was determined by the needs of the whole display system, and scaled for context and audience contour.

How significant was the portable projector and the provisional cinematic context it facilitated? Was it paradigmatic, indicative of a wholly different kind of cinema? Or was it just an odd or minor manifestation of a technological condition that would only truly arrive with the fluidity of the digital? Such questions can't necessarily be answered by numbers, but here are a few.

We know that the number of movie theaters in the United States gradually increased throughout the 1920s, decreased during the 1930s, increased to a peak in 1945, and then rapidly declined by more than 50 percent in the twenty years that followed (from 19,096 in 1945 to 9,150 in 1963). As a result, we have the received wisdom that at midcentury cinema declined and television ascended. And ascend television did. Yet, so too did this other kind of cinema. Sales of small-gauge portable equipment roughly tripled in annual sales during the 1950s.[9] In just one year, 1959, the SMPE estimated that there were 4,195,000 portable projectors in use. This equates to one projector for every 42.2 people. Compare this to the statistic for movie theaters: one theater for every 15,627 people (or 11,335 movie theaters total). In raw, crude figures, portable projectors outnumbered movie theaters by a factor of 370.

Clearly, these numbers cannot account for many significant factors, among them seating capacity and frequency of use. Nonetheless, cinema's small, portable projector and screen provide a productive challenge to those engaged with the question of what cinema precisely has been and what it is becoming. The small machines of cinema provide a compelling continuity or bridge from the philosophical toys we often associate with precinema (thaumotropes, stereoscopes, zoetropes) to what we often call late cinema or postcinema (tablets, laptops, cell phones). Yet, they also provide a kind of discontinuity to many of our dominant film narratives, opening a place in our ongoing scholarly dialogues for a number of productive areas of inquiry, including consumerism and consumer electronics, gadgetry, cinema's complex technological and multimedia anatomy, image variability (size, brightness, clarity, speed, volume), the dynamics of expanded moving-image performance, cinema's transformations of everyday and institutional spaces, and the use of film technologies for changing ideas about public and private modes of address. *

8 Da-Lite Screen Company advertisement, *Educational Screen* (April 1934): 89.

9 All numbers from the US Department of Commerce, reprinted in *The Wolfman Photographic Industry in the United States*, June 1960.



08 InFocus_143-174_CJ_51-2 cs3.indd 154 11/15/11 8:11:58 PM

# Sound and Domestic Screens

by Steve J. Wurtzler

My starting point is several old phonograph recordings, discarded by someone and then acquired by me at a now-forgotten secondhand store, before eBay dragged everyone's attic contents out into the light of a collective, virtual yard sale. The records are a series, four LPs released by the magazine *Popular Photography* from 1965 to 1969, called *Sound for a Picture Evening.* What can these artifacts teach us about cinema?

My claim, necessarily suggestive rather than fully developed, is that these recordings, designed to accompany projections on domestic film screens, point to ways in which cinema always has been an intermedial phenomenon. Far from being a specific and discrete "apparatus," cinema intersects other media forms both materially and experientially. Some of my earlier research argued that cinema's conversion to sound was simply one component of a broader, interwar instance of technological change across multiple media forms.[1] Technologically, economically, and experientially, cinema's successful adoption of recorded sound must be understood in light of developments in multiple acoustic media. This short essay essentially expands that argument, stretching it both forward in time and outward to include more marginal practices, using domestic cinema screens and sound practices as a case study.

Admittedly marginal to academic Film Studies (albeit decreasingly so), home movies represent a century-long cluster of texts, technologies, and practices through which the very possibilities of cinema have been exploited and explored. Variously denigrated as "substandard" or "amateur," like other so-called ephemeral films, home movies nonetheless quietly insist on a broadened definition of cinema as a representational technology. This broader notion of cinema threatens to undermine historical and theoretical perspectives that are solely based on the economically and ideologically valorized commercial deployment of the medium. Historically, home movies have intersected with documentary film practice, the avant-garde, and the tinkering hobbyist, as well as with commercial cinema. And like commercial cinema, home movies have often themselves resided at the intersection of what we might normally think of as discrete media forms.

In the late 1960s, *Popular Photography* released at least four phonograph records designed to accompany home movies and slide shows. The *Sound for a Picture Evening* series provided an expansive variety of background music and sound effects, essentially a library of recorded sounds for home

1 Steve J. Wurtzler, *Electric Sounds: Technological Change and the Rise of Corporate Mass Media* (New York: Columbia University Press, 2007).



08 InFocus_143-174_CJ_51-2 cs3.indd 155 11/15/11 8:11:58 PM

moviemakers. The cuts on the records are categorized as different types of sounds: Themes, Sound Effects, National Portraits, Special Purpose Music, and Openings and Closings. Within those categories the recordings exhibit tremendous acoustic variety. Sound effects include thunder and rain, a cocktail party, oars in water, a dog barking, a baby crying, crickets chirping, fireplace sounds, and traffic noises. Most of the sound effects logically evoke images common to home movies. The practice of providing nations with acoustic signatures echoes a convention of silent-film cue sheets (in which a few bars of music claimed to signify a region: Russia, Africa, Greece, Japan, etc.), adapting that convention for midcentury family travelogues. Openings available for home movies could be "grandiose," "sweet and gentle," or "dramatic." Closings could be "epic," "Hollywood style," or (again) "gentle."

The most interesting sounds don't seem at first to evoke a specific image or, in their naming, call to mind an anticipated sound. For example, Volume II includes the two-minute cut "Experimental." "No melodies here," the record jacket explains, "just moody, strange instrumental sounds." Further, the domestic listener (or acoustic performer) is instructed to try "Experimental" at different speeds, especially 16 or 78 rpm, indicating the creation of structural space within which projectionist-performers might engage in a kind of idiosyncratic sound design. Volume IV includes "Music to Zoom By," which answers the question "what does a zoom sound like?" When played today, uninterrupted from start to finish, the LPs provide a maddening cacophony. When taken on their own and with sensitivity to period terms, they provide an astoundingly diverse resource for amateur sound design.

*Sound for a Picture Evening* might best be understood in terms of at least two trajectories: a history of acoustic accompaniment for the domestic screen, and a tradition within home-movie culture that sought to shape home-movie practices around a normative notion of showmanship.

Simultaneous with the adoption of synchronous recorded sound by the US film industry, various manufacturers of movie equipment for the domestic market released so-called dual systems for projecting both sound and images in the home. Essentially synchronizing a phonograph with a 16mm projector, early 1930s devices like the Victor Animatophone gave home-movie enthusiasts the ability to project commercially released films with recorded sound on discs and, importantly, the option of selecting from their own record collections musical accompaniment for their home movies.

Although manufacturers soon marketed equipment to amateurs that allowed the synchronous recording of sound and image, sound for the domestic screen remained largely a matter of postsynchronous performance for technological, financial, and aesthetic reasons. In 1934, RCA released the 16mm Autophone camera, a single-system device in which sound and image were recorded simultaneously on the same strip of film, but the microphone's placement a few inches below the camera's viewfinder structurally limited the potential recorded sounds to the voice of the cameraman speaking as he filmed. The Autophone, termed a "newsreel-type system" because it could only record voice-over narration, was a few years later subject to a kind of

2 Clarence Aldrich, "An Amateur's Adventure with a Sound Camera," *Home Movies* (June 1944): 232–233.



08 InFocus_143-174_CJ_51-2 cs3.indd 156 11/15/11 8:11:58 PM

ingenious modification by some particularly ambitious consumers. In 1944, amateur filmmaker Clarence Aldrich modified an Autophone so that he could record sync-sound films on a set.[2] By and large, though, the possibilities for synchronous recording of sound and image were for some time constrained by both product design and expense. For example, the Auricon dual system, a sound-on-film recorder (a device that recorded sound on a separate strip of film) was released around 1942 and retailed for $695 (approximately $9,200 in 2010 dollars), while Auricon's single-system sound-on-film camera sold for $880 (approximately $11,600 in 2010 dollars). More than technological design and expense pushed home-movie sound toward postsynchronous accompaniment. As early as 1932, the magazine *Photo-Era* argued strongly against the use of direct sound recording ("the actual sound which accompanies the action which makes up the subject of the usual amateur film is uninteresting and inconsequential"), advocating instead the careful crafting of postsync accompaniment only after editing of the film had been completed.[3]

While some amateur filmmakers explored the possibilities of synchronous sound recording, much of the discourse and apparent practices of domestic cinema maintained what the Victor Animatophone had begun: providing postsynchronous accompaniment for home movies, often through quite imaginative hybrid combinations of cinema projection with other domestic media forms. Publications directed toward amateur filmmakers, like *Home Movies*, *Cin-O-Grams*, and *Movie Makers*, advocated various combinations of microphones, turntables, home radio, and commercially available recordings, in some cases even suggesting specific records that might be suitable for specific types of scenes. During the postwar era, the commercialization of magnetic tape as a sound-recording medium added reel-to-reel tape recorders to the home moviemaker's potential repertoire. But even then home-movie sound was largely understood as properly a postsynchronous construction and performance. By 1952, Bell and Howell and other manufacturers were advertising adding magnetic stripes to domestic cinematographers' already-edited films as a method of recording postsynchronous soundtracks.[4]

The LPs *Sound for a Picture Evening* provided late 1960s home moviemakers with the resources for a potentially complex approach to designing sound for domestic screenings. A carefully selected combination of the records' cuts could have been played live on a phonograph, prerecorded on audiotape, or even added to edited home-movie footage using a magnetic sound stripe. In other words, sound for the domestic screen most often involved a shifting combination of several media forms.

Through this hybrid combination of various technologies, one could potentially accompany home movies with a considerable range of sounds. It's unlikely, however, that many home moviemakers did, because of a series of discursive restrictions circulated under the banner of "showmanship." Like the disciplinary, cautioning rhetoric that suggested proper domestic filming and editing techniques (pan slowly, use the zoom lens sparingly, use filmed signs to substitute for printed titles, etc.), domestic acoustic accompaniment came with a set of evolving rules. Propagated by both equipment

3 Herbert C. McKay, "Some Amateur Aspects of Sound," *Photo-Era* 68 (March 1932): 162.

4 *Panorama*, "Adding Sound to Your Vacation Movies" (Fall 1952): 10–11.



08 InFocus_143-174_CJ_51-2 cs3.indd 157 11/15/11 8:11:58 PM

manufacturers and home-movie practitioners in the abundant journals, books, and pamphlets that circulated concerning home movies, a disciplinary ethos of showmanship advocated a series of specific, overlapping principles for how one might successfully combine cinema with other domestic media technologies.

Initially, and then throughout the postwar period, recorded acoustic accompaniment for home movies was presented as an antidote to the unduly chatty, ad-libbing projectionist. If live, spoken narration was to accompany home movies (through a microphone attached to one's radio, for example), it was to be carefully scripted and timed, thoroughly rehearsed, and appropriately augmented with recorded music. The guidelines for proper exhibition of domestic motion pictures controlled the spontaneous speech of the projectionist, offering instead carefully selected and prepared postsynchronous sounds. Articles providing advice on selecting music for home-movie accompaniment linked showmanship with consistency, simplicity, and the avoidance of overly familiar music. Postsync sound was premised on the sonic remaining secondary to the screen. Not surprisingly, musical rhythm was supposed to match the pace of on-screen action, but projectionists were cautioned to avoid abrupt transitions from one musical selection to the next. Orchestral recordings were advocated over choral, string quartet, or popular recordings, and projectionists were cautioned to avoid well-known compositions such as "Moonlight Sonata" and the "Blue Danube Waltz."[5]

The phonograph recordings *Sound for a Picture Evening*, admittedly only a minor footnote to US media history, point to the intersection within domestic space of what might otherwise be considered discrete media. The set of LPs, as well as other previous and contemporary texts, discourses, and practices, encouraged home moviemakers to become sound designers and enabled conventional protocols of showmanship (overtures and "exit music"), while also encouraging some limited acoustic experimentation (playing a recording at varying speeds). Appearing toward the end of a multidecade history of home-movie sound accompaniment, the recordings attest to the fact that the "apparatus" of the domestic screen consisted of a tangle of consumer-grade electronics such as phonographs, microphones, the radio, and reel-to-reel audiotape.

Historically, cinema production and reception are imbricated with other forms of text-making and text-experiencing in mutually constituting ways. To conceive of a single cinematic apparatus as a historically autonomous technology, or as a now digitally eclipsed phenomenon, is and always has been somewhat problematic. As we address the cinematic apparatus or teach the work of such theorists as Jean-Louis Baudry and Jean-Louis Comolli, we do so as part of an intellectual history of film theory, an intellectual history that might ideally be better informed at the very least by an invocation of all of those "marginal" cinematic practices that rub against the edges of a notion of cinema, per se. In these few pages, I've tried to direct attention to one set of marginal practices, domestic screens and the sounds that accompanied them, so as to suggest a more plural definition of cinema that resides at the intersection of multiple media forms. My book *Electric Sounds* took as its subject what we might think of as the

5 Donald Maggini, "Good Music for Good Films," *Movie Makers* (October 1942): 400–401; and Robert E. Johnson,



08 InFocus_143-174_CJ_51-2 cs3.indd 158 11/15/11 8:11:58 PM

center of cinema as an institution, tracing some of the actions of emerging multimedia conglomerates and the intermedial consumer experience of mainstream texts. Here, I have begun to suggest that what characterized the center of cinema is echoed at its margins: technologically and experientially, cinema has long been an intermedial phenomenon. *

# The Screen on the Set: The Problem of Classical-Studio Rear Projection

by Julie Turnock

Rear projection was the primary special effects technology in the Hollywood studio system from about 1935 to about 1970.[1] Rear projection's major advantage over other composite techniques was its efficiency: it could be completed immediately on the set, under the control of the producer, director, and cinematographer, instead of much later and much more slowly in postproduction. Yet, although it may have been favored by the studio producers, research suggests that the effects technicians in charge of the technique never solved the problem that we recognize quite clearly today: the discrepancy of the image quality between the foreground and background. Farciot Edouart, who was a special effects industry leader and head of Paramount's rear projection department, proclaimed rear projection's equipment "perfected" in 1943; however, examples of rear projection from many midcentury films would seem to suggest that he was overly optimistic.[2] This essay describes the

1 There is only meager mention of rear projection in the canonical surveys. In David Bordwell, Janet Staiger, and Kristin Thompson's *The Classical Hollywood Cinema: Film Style and Mode of Production to 1960* (New York: Columbia University Press, 1985), rear projection is only mentioned tangentially in relation to other topics, such as deep-focus photograpy (349) or Technicolor (354). Tino Balio's *Grand Design: Hollywood as a Modern Business Enterprise, 1930–1939* (New York: Scribner, 1993) includes a short discussion of special effects techniques of the 1930s, in which rear projection is included (131–132), contributed by Bordwell and Thompson. Thomas Schatz's *Boom and Bust: American Cinema in the 1940s* (Berkeley: University of California Press, 1999) includes no discussion of special effects at all. In Peter Lev's *The Fifties: Transforming the Screen, 1950–1959* (Berkeley: University of California Press, 2003), rear projection is not discussed at all in the "Technology and Spectacle" chapter. See also Barry Salt, *Film Style and Technology: History and Analysis* (London: Starword, 1992), 209. For theoretical approaches to rear projection, see Laura Mulvey, "A Clumsy Sublime," *Film Quarterly* 60, no. 3 (Spring 2007): 3; and Dominique Païni, "The Wandering Gaze: Hitchcock's Use of Transparencies," in *Hitchcock and Art: Fatal Coincidences*, ed. Païni and Guy Congeval (Montreal: Montreal Museum of Fine Arts, 2000).

2 Farciot Edouart, ASC, "The Evolution of Transparency Process Photography" (1943), in *The ASC Treasury of Visual Effects*, ed. Linwood Dunn and George E. Turner (Hollywood: American Society of Cinematographers, 1983), 115.



08 InFocus_143-174_CJ_51-2 cs3.indd 159 11/15/11 8:11:58 PM

technical specifications of rear projection, its adaptation as the primary composite technique for Hollywood studios by 1940, and its baseline practice in the mid-1950s.

It is the spectacular special effects of science fiction and fantasy that have thus far received the majority of our attention. Why explore rear projection, a classical-studio technique that succeeded in streamlining production, but which, according to the technicians in charge of it, never actually achieved the system's desired perfect seamlessness? By analyzing technical discourse of the studio era, we can see how special effects problematize theories that homogenize classical Hollywood cinema into a series of norms into which all exceptions can be subsumed and regularized.[3] Providing a historically rigorous account of rear projection is also part of a larger project that seeks, first, to understand the importance of special effects, both locally in the case of specific films and more broadly in terms of historical industrial practices, and, second, to demonstrate the importance of troubling ostensibly settled terms and theories in Film and Media Studies.

As many technical articles in professional journals like *American Cinematographer* attest, the concept of rear projection is very simple to explain and understand, but technologically very difficult to pull off seamlessly. In the most simple terms, rear projection is a special effect composite technique that involves projecting prefilmed footage behind actors on the set, typically to present the illusion that the actors are in a far-flung location and not on a sound stage. Rear projection background footage, called "plates," is seen most often in shots of actors speaking dialogue while in a car or other moving vehicle.[4] If the projected background is moving, it is typically called a process shot.[5] If the background is still, it's called a transparency shot.[6]

One surprisingly prevalent misconception about rear projection is that it is basically the same as blue or green screen composites, a technique that we are very familiar with in the post–*Star Wars* (George Lucas, 1977) era. Both techniques do indeed typically share the goal of compositing the main actors with a background and creating the illusion of a seamless diegesis. However, technically, they have very different on-set and postproduction specifications and, of course, require very different equipment. Again, rear projection's main advantage is that it is completed in the camera and *on the set* at the same time as principal photography by studio personnel, in the presence of the main actors and the director, and checked almost immediately in the dailies. Blue screen composites (part of a varied set of postproduction composite techniques known historically as traveling mattes or simply "opticals") are created by having the actors perform in front of a blank blue screen. In the classical era, blue screen composites were completed by optical printing specialists, often subcontractors, long after the actors had been dismissed, often with director, cinematographer, and art director nowhere in sight.[7]

3 Bordwell, Staiger, and Thompson, *Classical Hollywood Cinema.*

4 Raymond Fielding, *The Technique of Special Effects Cinematography* (New York: Hastings House, 1968), 259–304.

5 Frederick Foster, "The Photography of Background Plates," *American Cinematographer* (February 1962): 98.

6 The terminology that differentiates various special effects techniques is wildly inconsistent. See William Stull, ASC, "Producers Pool Composite Process Patents," *American Cinematographer* (November 1936): 461. For more about the technical specifications, see Fielding, *The Technique of Special Effects Cinematography*, 264–266.

7 On "opticals" versus "process shots," see Julie Turnock, "Plastic Reality: Special Effects, Art and Technology in 1970s US Filmmaking" (PhD diss., University of Chicago, 2008); Fielding, *The Technique of Special Effects*



08 InFocus_143-174_CJ_51-2 cs3.indd 160 11/15/11 8:11:58 PM

Rear projection was used in countless westerns, women's pictures, social problem films, musicals, crime thrillers, teen pics, comedies, war pictures, historical dramas, and even *Citizen Kane* (Orson Welles, 1941). Although ignored by academics and special effects enthusiasts alike, the adoption and standardization of rear projection across the studios in about 1939 aided the overall institutionalization of classical Hollywood cinema. As Paramount's Edouart insisted, on-set rear projection was central in helping production become more streamlined, safe, and consistent.[8] Moreover, allowing for the technological specifications of rear projection affected, and to a great degree controlled, many aspects of production, including arrangement of the mise-en-scène, size of the studio, staging of the actors, camera movement, focus, lighting, and sound recording.[9] The history of how rear projection became the dominant special effect composite technique in Hollywood is complex and beyond the purview of this essay. In brief, however, rear projection (also known as "process photography") was developed to replace risky in-camera composites as well as the meticulous, frame-by-frame postproduction technique of composites produced via opticals.[10]

In viewing films by great midcentury auteurs such as Alfred Hitchcock, Douglas Sirk, and Vincente Minnelli, many film historians and theorists, not to mention students in the classroom, wonder, why does the rear projection often look so *bad*? "Bad" in this case is usually characterized by a recognizable difference between the foreground action and the rear projection footage; it is "fake" and distracting. Certainly, by contemporary standards of photorealism, rear projection is often distractingly obvious.

Did producers and spectators in the past think that it looked bad? And if it did look so bad, why did the technique persist, especially since postproduction opticals were felt by many technicians to create a more seamless photorealistic effect?[11] These questions are at the center of why rear projection is an important subject of inquiry. As the technicians acknowledged, the primary problem contributing to obvious-looking rear projection is that of image quality: when filming the first-generation foregrounds, the pre-photographed projected image is always a second generation, or "dupe," and therefore a lesser-quality image. Further, rear projection exaggerated any flaw in the projected background plate. Technicians worked to remedy this situation by boosting the lights of the projectors, filming background plates with higher-format film stock such as Vistavision or 70mm, increasing the flexibility or reflectivity of the screen, and using many other complicated processes.[12] However, they were never able to completely eliminate the degradation of image quality in the rephotographed

*Cinematography*; and Richard Rickitt, *Special Effects: The History and Technique* (New York: Billboard Books, 2000).

8 Edouart, "The Evolution of Transparency Process Photography," 108.

9 Charles Anderson, "Background Projection Photography," *American Cinematographer* (August 1952): 342.

10 See Fielding, *The Technique of Special Effects Cinematography*, 191; and Stull, "Producers Pool Composite Process Patents."

11 Lynn [Linwood] Dunn, ASC, "Optical Printing and Technique," *American Cinematographer* (March 1934): 444.

12 Herb Lightman, "MGM's 'Laced-Process' Rear-Projection System," *American Cinematographer* (August 1964): 456, 466–467.



08 InFocus_143-174_CJ_51-2 cs3.indd 161 11/15/11 8:11:58 PM

plates.[13] Despite these very visible drawbacks, the practical benefits involved in rear projection—speed, efficiency, consistency, and controllability—largely explain why it was the favored technology for so long. It was not until the 1970s (again, largely post–*Star Wars*) that the shift away from the perceived benefits of on-set compositing began in earnest, as postproduction blue screen and other optical-printing composite work became the norm.

There is much at stake in gaining a better grasp on rear projection's historiographic implications. For one thing, examining the problems special effects artists faced with issues of designing and implementing classical-style unobtrusive photorealism brings to light, in specific terms, the laborious struggle to construct the classical diegesis that has typically been understood as "seamless." What is especially intriguing is that even after several decades of research and development, it was the technicians who objected to rear projection, despite its complete acceptance by those in power—especially the producers, but also, to a lesser degree, the directors and cinematographers.[14] Thus, the problem of rear projection initiates an interesting dynamic, raising questions about the assumed totalizing effect of the classical system. More to the point, composite work in general, but rear projection in particular, can show us the seams of a classical Hollywood system in which various players disagreed on aesthetic matters. Classical Hollywood photorealism is often assumed to be congruent with—and to a great degree a result of—Fordist production practices. However, the persistence of rear projection displays cracks in the system by demonstrating that a conscious and, to a degree, controversial choice was made to pursue a production technique that favored industrial efficiency standards over the experts' aesthetic ideals.

Whether one agrees or not with the judgment that rear projection "looks bad," it is important to ask, what was the baseline practice at midcentury? Alfred Hitchcock's *To Catch a Thief* (1955) can serve as an interesting example. In a striking sequence that relies heavily on rear projection, John (Cary Grant) and Francie (Grace Kelly) drive along the Riviera coastline, making hairpin turns and sparring verbally while being tailed by police (Figure 1). Edited together with location shots completed by the second unit, the shot cuts to the foreground actors, sitting in a glossy, bluish-green car, in very sharp focus. Rather hard, shiny lighting effects sculpt the figures of the actors in richly colored Vistavision Technicolor, especially noticeable in Francie's shimmering highlighted blonde hair and bright salmon-pink dress and John's deeply tanned, somewhat leathery skin. The background plates, by contrast, are faded and smudged, which is different from simply being out of focus. The color of the plates is of a markedly more muddy hue and cool blue tone than the foreground. Also, there is a subtle difference in the way the eye perceives the speed of the car and the speed of the background. These differences persist despite the large-format Vistavision system, used to film both the foreground and background plates; at the time this system was marketed as providing the most saturated color possible.[15] The effect of the contrast

13 Ibid.; Edouart, "The Evolution of Transparency Process Photography," 108.

14 Bill Taylor, ASC, interview by Julie Turnock, July 25, 2006, Illusion Arts offices, Van Nuys, CA.

15 Loren Ryder, *A Statement from Paramount, about Vistavision* (Los Angeles: Paramount, 1954), http://www.widescreenmuseum.com/widescreen/vistavision.htm (accessed June 29, 2011).



08 InFocus_143-174_CJ_51-2 cs3.indd 162 11/15/11 8:11:59 PM

Figure 1. In the mid-1950s, principal photography's crisp, clean, saturated colors in the foreground grate against the hazy, blurry background plates of the rear projection unit, even in films with high production values, like Alfred Hitchcock's *To Catch a Thief* (Paramount, 1955).

of foreground and background, common in such scenes (and not solely attributable to Hitchcock's intention), is like a shallow stereoscopic effect, and is noticeable as a composite, however subtly. In other words, the foreground makes one flat plane, and the background another flat plane; there is no fully convincing illusion of a whole. Color, large-format film stock, and the popularity of location shooting—in part initiated by films like *To Catch a Thief*—pointed up the visual disadvantages of rear projection and gave technicians headaches for the next two decades.[16] Research and reviews suggest that rear projection was not a major problem for directors, critics, or the mythical "average" moviegoer, and the studio technicians thus found their aesthetic standards to be out of sync with the majority, yet they continued working to improve the technology.

What do we get from pursuing a detailed approach to the problem of rear projection? Certainly, we can establish parameters for understanding photorealism as a historically variable style, and as a style under dispute even despite what would seem to be very consistent production conditions.[17] Tracking the midcentury debates among technicians and the perceived failure to compensate for problems with rear projection shows that the special effects technicians, traditionally low men in the studio hierarchy, had competing notions of photorealism and different priorities than the directors, producers, and cinematographers. That they even acknowledged that there was a problem suggests chinks in the armor of the classical style and the seemingly monolithic

16 See Edouart, "The Evolution of Transparency Process Photography"; Anderson, "Background Projection Photography"; and Lightman, "MGM's 'Laced-Process' Rear-Projection System."

17 Similarly, on the transition to sound film, see Jim Lastra, *Sound Technology and the American Cinema* (New York: Columbia University Press, 2000).



08 InFocus_143-174_CJ_51-2 cs3.indd 163 11/15/11 8:11:59 PM

studio production system. Rear projection was, in sum, perfectly consistent with the Hollywood studio production system, but not with its ideal seamless aesthetic. The visible seams in the classical system vividly exhibit and, to a degree, narrativize the industry-wide struggle to maintain the illusion of picture-perfect realism. ✻

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# Experimental Screens in the 1960s and 1970s: The Site of Community

by Tess Takahashi

It is common knowledge—though often forgotten—that experimental film production in 1960s and 1970s expanded not only what constituted a screen, but where screens could be located and used. Gene Youngblood documents this multiplication of screens via experiments with mobile cinema vans, portable inflatable cinema, and screenings in artists' spaces and galleries, on public and broadcast television, on concert stages in conjunction with live music, in planetariums, in the home, in the classroom, and in enormous multiscreen environments, which utilized multiple media such as 16mm 8mm film formats, slide projectors, and television monitors. Artists across disciplines in this period, including film, paid attention to the materiality of the screen, the spaces in which screens appeared, and the communities that congregated around them. In many cases, filmmakers themselves served as programmers, distributors, and exhibitors of experimental film. However, within the scholarship on experimental media, this proliferation of cross-screen experimentalism and new display environments tends to get passed over in favor of attention to the medium, or media, on which a work was produced. A tendency to focus on the experimental artist and his or her production process has only reinforced this emphasis. As a result, moving-image practices have been discussed in relatively siloed disciplines: experimental video art and performance in Art History; avant-garde film in Cinema Studies; and television and its audiences in Communication and Media Studies.

This artificial disciplinary segregation largely ignores the site and context of the screens on which experimental work was shown and



08 InFocus_143-174_CJ_51-2 cs3.indd 164 11/15/11 8:11:59 PM

encountered.[1] Within Art History, video art in this period is seen far too often by outsiders as hermetic and, in the oft-cited words of Rosalind Krauss, "narcissistic," with the monitor functioning as a mirror for the artist's gaze.[2] Video audiences, often key to the very constitution of the art itself, are almost entirely absent. Likewise, within Film Studies, experimental work tends to be associated with formalist, medium-specific, "structural" film, which has been described as film that focuses exclusively on the specific properties of celluloid and projection. In this context, screens are usually described as flat, white, and material rather than as part of a site that includes a moment of performance and also an audience. Within Communications and Media Studies, TV gets figured as a medium for a large mainstream audience, its screen understood as the one-way instrument of broadcast for the insular family unit. In that context, TV is rarely seen as an experimental medium. However, audiences have seldom been segregated completely by medium. Experimental screens in all guises have often brought together multiple media and multiple constituencies: the art world, the avant-garde film world, and mainstream audiences.

In response to the critical tendencies described above, and in line with recent research on the 1960s and 1970s avant-garde, I suggest that we shift our gaze from medium-specific experimental works and the artists who made them to the screens on which the experimental work appeared. "Screens" mean screening spaces. When I speak of experimental screens, then, I reference three kinds of screening sites: screenings of experimental work on physical screens that were key to the work's construction and function; screenings of experimental work in traditional theatrical space; and screenings of experimental work in nontheatrical spaces, often in nontraditional venues like clubs, fields, churches, backyards, university classrooms, and, most important, the home.[3]

The first category, the spectacular, formally experimental screen, tends to get all the attention, and with good reason. One thinks of the famous horizontal and multiple film screens that composed the *Labyrinthe* exhibit developed by Roman Kroitor, Colin Low, and Hugh O'Connor at Expo '67 in Montreal, the Eames multiscreen *Glimpses of the USA* venture in Moscow in 1959, Jordan Belson's Vortex projections at the San Francisco planetarium, and Stan VanDerBeek's movie-drome in upstate New York.[4] Likewise, there were spectacular experimental assemblages of video screens, often in

1 Sites of exhibition and consumption are areas that until very recently have been under-investigated in the critical tradition of studies of experimental film and video, with some exceptions. See David E. James, ed., *To Free the Cinema: Jonas Mekas and the New York Underground* (Princeton, NJ: Princeton University Press, 1992); Scott MacDonald and Amos Vogel, eds., *Cinema 16: Documents toward a History of the Film Society* (Philadelphia: Temple University Press, 2002); Sky Sitney, "The Search for the Invisible Cinema," *Grey Room* 19 (Spring, 2005): 102–113; Michael Zryd, "The Academy and the Avant-Garde: A Relationship of Dependence and Resistance," *Cinema Journal* 45, no. 2 (2006): 17–42; and Steve Anker, Kathy Geritz, and Steve Seid, eds., *Radical Light: Alternative Film and Video in the San Francisco Bay Area, 1945–2000* (Berkeley: University of California Press / Berkeley Art Museum and Pacific Film Archive, 2010).

2 Rosalind Krauss, "Video: The Aesthetics of Narcissism," *October* 1 (1976): 50–64.

3 Such screening venues are nontraditional, but not unusual for the cinematic avant-garde, whose chronic impoverishment has resulted in an ability to make do.

4 According to the National Film Board of Canada, 1.2 million people went through *Labyrinthe*; see *Time*, "Fairs: Goodbye to the Expo," November 3, 1967, http://www.time.com/time/magazine/article/0,9171,837461,00.html. See also Gene Youngblood, *Expanded Cinema* (New York: Dutton, 1970); and Beatriz Colomina, "Enclosed by Images: The Eameses' Multimedia Architecture," *Grey Room* 2 (Winter 2001): 6–29.



08 InFocus_143-174_CJ_51-2 cs3.indd 165 11/15/11 8:11:59 PM

combination with other media, like Nam June Paik's *TV Garden* (1974), as well as his smaller-scale constructions for performances by cellist Charlotte Moorman, which included a TV bra, TV bed, and TV cello. Aldo Tambellini's large-scale Black Gate Theater (1967) utilized multiple media, including slides, live light sources, and video monitors showing tapes and closed-circuit images. Likewise, Juan Downey's multimedia extravaganza in Syracuse, *Three-Way Communication by Light* (1972), incorporated video, Super 8mm film, and laser beams.[5] Such physically elaborate screenings had the structure of an event—special, rare, and not to be missed—and often drew large, diverse crowds composed of artists, aficionados, gawkers, and cultural tourists.

However, most experimental film, video, and multimedia screenings happened on the second kind of screen, traditional theatrical space. Throughout the heyday of 1960s experimental film production, sites like Cinema 16 and the Film-Maker's Cinematheque (later Anthology Film Archives) in New York City held regular screenings.[6] These screenings happened usually, but not always, on traditional white screens in traditional theatrical space. However, these screens were never purely experimental in content. Rather, they regularly incorporated art cinema, classical Hollywood narrative, silent serials, animation, science film, documentary, and exploitation film—for audiences of up to 1,600 people in the case of Cinema 16 at its height. Theatrical screening spaces that showed experimental film often incorporated other artistic forms like music, dance, and video. While Anthology Film Archives, with its Essential Cinema series, tends to be associated with the aspiration for cinematic purity, in the 1960s and 1970s it was home to video and multimedia performances, featuring artists like Nam June Paik, Beryl Korot, and Woody and Steina Vasulka. On the flip side, screening spaces known primarily for showing video, like the Kitchen, regularly screened experimental film.

However, the third kind of space, nontraditional theatrical space, was probably the most important for experimental film and media in the 1960s and 1970s. Screening series dedicated to experimental work frequently migrated because of limited funds and availability, a tendency that also characterizes today's microcinema. Canyon Cinema functions as an emblematic example. Throughout the 1960s and 1970s, Canyon used traditional theatrical spaces in the Bay Area like the Fillmore, the Avalon, the Presidio, and the Gate Theater. It also set up makeshift screens at the Berkeley YMCA, "the Bistro run by the Wobblies in Berkeley" (in the words of Chick Strand), a bar on San Pablo Avenue, the Masonic Hall, the Coffee Gallery on Grant Street, the Tape Music Center on Divisidero Street, the San Francisco Mime Troupe theater, and the Glide Memorial Church.[7] Canyon also partnered with colleges, holding screenings at

5 Peter Frank, "Video Art Installations," in *Video Art: An Anthology*, ed. Beryl Korot and Ira Schneider (New York: Harcourt Brace Jovanovich), 204–209.

6 Run by Amos and Marcia Vogel between 1947 and 1963, Cinema 16 held screenings at various sites including the Paris Theater, the Hunter College Playhouse, the Fifth Avenue Playhouse, the Provincetown Playhouse, the Beekman Theater, the Murray Hill Theater, the Central Needles Trades Auditorium, and various first-run theaters in Manhattan. Jonas Mekas screened films at the Charles Cinema, the Gramercy Arts, the Maidman Theater, the City Hall Cinema, the 41st Street Theater, 80 Wooster Street, the Methodist Church, the Bleecker Street Cinema, the Elgin, the Gotham Art, the Gallery of Modern Art, Joseph Papp's Public Theater (Home of the Invisible Cinema), and Anthology's current location at Second Avenue and East Second Street.

7 Strand quoted in Anker, Geritz, and Seid, *Radical Light*, 118.



08 InFocus_143-174_CJ_51-2 cs3.indd 166 11/15/11 8:11:59 PM

the local California College of Arts and Crafts and the San Francisco Art Institute. As Michael Zryd notes, the university classroom became an important and enduring setting for experimental film screening, even at the height of its popularity.[8] Over the years, Canyon also screened films at a variety of private homes, including those of Bruce Baillie, Chick Strand, and Ernest Callenbach.[9] Despite their often peripatetic movement, experimental screening series such as Canyon's often happened on a regular calendar, and thus became important sites of communal gathering.

As an experimental screening space, the private home was, and continues to be, a significant informal gathering site. Filmmakers and programmers held salon-style screenings in their homes for small groups of friends and acquaintances on makeshift screens. In an interview with Scott MacDonald, Robert Breer recounts that "Amos [Vogel] had parties in his apartment, and I remember him showing *Blazes* (Breer, 1961); he had a screen propped up on a pillow in his bedroom."[10] Likewise, P. Adams Sitney describes Ken Jacobs's informal home screenings for friends of the unfinished *Tom, Tom the Piper's Son* (1968). Strand describes Canyon Cinema's backyard screenings on bedsheets in the early 1960s: "We wanted the screenings to be a neighborhood thing. The audience was all friends, artists, academics, crazies. . . . Kids would certainly come, my own kids included; pets, too."[11] As Callenbach recalls, "It was important that people brought their friends to the programs. It was not just a showing; it was also a little tribal assemblage."[12] More recently, in the 1990s, Rick Prelinger held screenings combined with potlucks in his New York loft, just one of many examples of the continuing tradition of holding informal screenings in the home.

We often forget that even before VHS and DVD, the home could function as an experimental screening space for an audience of one. In the 1960s and 1970s, individual filmmakers, along with organizations like Canyon Cinema, New York's Filmmaker's Co-op, and Vogel's distribution arm of Cinema 16, worked to facilitate distribution of experimental films to cine-clubs, university classrooms, and private individuals. Experimental filmmakers and video artists also regularly loaned and traded their work through the mail. Such exchanges of prints and tapes were accompanied by letters about life, questions about the films themselves, and the gossip of the day. Sitney writes, "One of [Stan Brakhage's] major concerns has been the encouragement of private libraries of 8mm and 16mm films. . . . Since the early 1960s he had been prophesying a breakthrough for the avant-garde film-maker when films would be available for purchase like books, records, and painting reproductions and therefore be owned and screened many times and at pleasure," as videotapes and DVDs are today.[13]

8 In this period, the number of film courses offered in the United States expanded exponentially, from 244 in 1963 to 7,648 in 1979. Michael Zryd, "Experimental Film and the Development of Film Study in America," in *Inventing Film Studies*, ed. Haidee Wasson and Lee Grievson (Durham, NC: Duke University Press, 2008), 189.

9 Anker, Geritz, and Seid, *Radical Light*, 111–121.

10 Scott MacDonald, "Conversation with Robert Breer, 12/19/00," in MacDonald and Vogel, *Cinema 16*, 387.

11 Quoted in Anker, Geritz, and Seid, *Radical Light*, 117.

12 Quoted in ibid., 112.

13 P. Adams Sitney, *Visionary Film: The American Avant-Garde, 1943–2000*, 3rd ed. (New York: Oxford University Press, 2002), 183, 209.



08 InFocus_143-174_CJ_51-2 cs3.indd 167 11/15/11 8:11:59 PM

Finally, while it might seem counterintuitive, the home television screen sometimes also functioned as an experimental screen in this period. The adjective "experimental" usually conjures the image of small audiences, not the seemingly massive realm of broadcast television. However, the idea of television as a mass medium was crucial to the development of the artistic and cinematic avant-gardes of this period. It is not surprising, then, that artists' film and video showed up on broadcast TV from time to time. Some pieces were introduced gently to a broad audience, as with *Screening Room with Robert Gardner*, which aired on ABC's Boston affiliate WCVB in the 1970s and featured films by, and conversation with, guests like Breer, Hollis Frampton, and Yvonne Rainer. Other works showed up unannounced, often aired by artists who bought airtime during commercial breaks on individual television stations. The most notorious might be Chris Burden's *Through the Night Softly* (1973), in which a statically framed black-and-white video image shows the bound and nearly naked artist wriggling over a field of broken glass. Others, such as Gerry Shum's *Fernsehgalerie* (TV Gallery; 1968–1970), a series of programs conceived as televised art exhibits for German television, attempted to bring art out of the gallery in the mode of land art, process art, and performance without a word of explanation.[14] Valie Export's *Facing a Family* (1971), for example, confronted viewers of the Austrian television series *Kontakte* with the filmed image of a family watching TV while eating dinner.[15] Less well known, perhaps, is Stan VanDerBeek's mix of live transmission and prerecorded video in *Violence Sonata* (1970), which examined issues of race and violence. Broadcast on WGBH in Boston on two channels, *Violence Sonata* asked that people bring their TV sets into the homes of their neighbors and watch the two screens side by side.

What is the legacy of experimental screening spaces from the 1960s and 1970s? Some, like Anthology Film Archives and Canyon Cinema (its screening arm now the San Francisco Cinematheque), are still going strong decades later. However, in the past twenty years they have been joined by an explosion of experimental "microcinemas." Experimental screening series like Balagan (Boston), Early Monthly Segments (Toronto), Light Industry (New York), Magic Lantern (Providence), and a host of others have popped up, disappeared, and reemerged under other names all over North America. Ed Halter writes, "As filmmakers of the 60s, 70s, and 80s became instructors in the increasing number of film and video production courses in the 90s, the possibilities of minor cinema were passed down to a new generation of artists."[16]

In many ways, the microcinema movement is the most obvious legacy of 1960s and 1970s experimental screens. However, now as then, experimental screens are everywhere—on flat screens in the subway, on computer monitors via sites like YouTube and Ubu, at concerts with live image mixing, in theater productions, in the barn at Phil Hoffman's Film Farm in Mount Forest, and at Lincoln Center during the annual

14 Schum's "Identifications" featured filmmakers and artists like Valie Export, Richard Serra, and Joseph Beuys. Gerry Schum, "Letter to Gene Youngblood," June 29, 1969, *Medien Kunst Netz*, http://medienkunstnetz.de/source-text/89/ (accessed April 3, 2011).

15 Sarah Robayo Sheridan, *EX Guide: We Interrupt This Program: Print Ads and TV Spots by Artists* (Toronto: Mercer Union, 2009).

16 Ed Halter, "Head Space: Notes on the Recent History of a Self-Sustained Exhibition Scene for North American Underground Cinema," unpublished essay.



08 InFocus_143-174_CJ_51-2 cs3.indd 168 11/15/11 8:11:59 PM

experimental film festival Views from the Avant-Garde. By putting avant-garde film into full dialogue with other media, we uncover the ways in which experimental traditions and audiences have intersected not only with one another, but also with mainstream technologies and viewers. Further, in using the screen as a site of critical entry, we see that the history of avant-garde film extends far beyond the story of the artist and work. In reaching out to far messier and more material questions of display and circulation, the idea of "experimental film" also opens up: what was initially considered obscure, difficult, and hermetic instead emerges as a rich site of community, movement, and exchange. *

# The Crack in the Electric Window

by Charles R. Acland

You can always rely on Marshall McLuhan to supply memorably pithy aphorisms about media culture, even if his logic soon crumbles apart in your fingers. Reading his distinction between *light on* media, like film, and *light through* media, like television, he appears to have captured a fundamental aspect organizing screen technologies, namely projection versus emission.[1] But then he extends his observation to what are ultimately untenable claims about differing levels of cognitive and emotional involvement in each. As is the case with most dichotomies, it takes only a few counterexamples to reveal the wobbliness of the split. Film can be back-projected, video can be front-projected, and both were being done for years prior to McLuhan's own technologically static projections.

McLuhan's binary prompts him to declare that projected images situate spectators in the position of the camera, whereas the emission of light from television turns viewers into screens.[2] The notion of "viewers as screens" is provocative for screen culture scholars struggling to provide workable definitions for any and all "screens." At the most basic level, regardless of the light source, our faces are the surfaces on which both projections and emissions settle. Our eyes register the light, reflected or not, and our ears receive the sound waves. One such iteration of viewers as screens—the wide-eyed child, bathed in the light of a television, computer, or film—is a conventionalized representation of absorption and hypnotic media control; it is a figuration of the innocent actually becoming a media screen. But we need not reinforce this version of what C.

1 Marshall McLuhan, *Understanding Media: The Extensions of Man* (New York: McGraw-Hill, 1964), 313.

2 Ibid.



08 InFocus_143-174_CJ_51-2 cs3.indd 169 11/15/11 8:11:59 PM

Wright Mills might have called the cheerfully robotic spectator. Maintaining the sensory condition of our human screen-ness—sentient bodies oriented toward audiovisual media—as a conceptual anchor helps film and media scholars avoid rigid typologies of mechanisms that stimulate sensations, which is a philosophical dead end toward which so many after McLuhan continue to dash. For all its variations, we should begin by acknowledging that the concept of the "screen" stitches together an identifiable and meaningful array of artifacts. We just seem to know what it is reflexively: a thing that glows and attracts attention with changing images, sounds, and information.

Technical specifications—screen size, aspect ratio, resolution, frame and refresh rate, brightness, color scale—might help us define what we are talking about in a specific instance, or better yet complicate what we presume we know about media. But the mechanical level only gets us so far in our job of actually understanding the related senses, sensibilities, and practices that form as a consequence of media use. All those unruly features of human existence simply can't be neatly confined and appended to medium specificity. As Raymond Williams wrote, and emphatically italicized, "*[N]o mode of production and therefore no dominant social order and therefore no dominant culture ever in reality includes or exhausts all human practice, human energy, and human intention*."[3] The human element that exceeds structuring concepts equally speaks to the boundaries that we claim exist between media, screen-based and otherwise.

So what is a screen? The question can be situationally answered with details about scale, technology, shape, tactility, portability, and location. Erkki Huhtamo's work has effectively taken the presentist air out of our inflated thinking, pushing us to understand the centuries-long trajectory of screen culture to include billboards and spotlights.[4] Other valuable research has made inroads by focusing on urban concentrations of screens, and some have elaborated on descriptive nuances to the term "screen" that include filter, protection, barrier, and surface.[5] As this and other research shows, the category of "screen" is baffling precisely because it is not in and of itself a medium, format, or platform. Rather, it is often an in-between manifestation of all three, one that materializes how we come to see and describe the differences and connections among television, film, computers, electronic signage, and digital spaces. In contrast to McLuhan's typological claims, our critical gaze is as much directed toward the integrated qualities of all the sites and locations that we casually understand as screens as it is toward the definitive distinctions between and among them.

Studies of screen culture provide limit tests to descriptions of our technological environment as well as to the way media have settled into disciplines. As an interdisciplinary research domain, screen culture has been effective in forcing the hand of Film

3 Raymond Williams, *Marxism and Literature* (New York: Oxford University Press, 1977), 125.

4 Erkki Huhtamo, "Elements of Screenology: Toward an Archaeology of the Screen," *Iconics: International Studies of the Modern Image* 7 (2004): 31–82; and Erkki Huhtamo, "Behind the Messages on the Wall: An Archaeology of Public Media Displays," in *Urban Screens Reader*, ed. Scott McQuire, Meredith Martin, and Sabine Niederer (Amsterdam: Institute of Network Cultures, 2009), 14–28.

5 McQuire, Martin, and Niederer, *Urban Screens Reader*; Kirsty Best, "Interfacing the Environment: Networked Screens and the Ethics of Visual Consumption," *Ethics and the Environment* 9, no. 2 (2004): 66–85; Gunther Kress, "'Screen': Metaphors of Display, Partition, Concealment and Defence," *Visual Communication* 5, no. 2 (2006): 199–204.



08 InFocus_143-174_CJ_51-2 cs3.indd 170 11/15/11 8:11:59 PM

Studies, challenging some of its more restrictive boundaries. Television Studies and Media Studies, not to mention Sound and Video Game Studies, have been relatively versatile and attentive to changing modes of production and circulation. But Screen Studies is essentially where the dust settled after the so-called death of cinema a few years back. Film Studies, sometimes in the voice of the art-loving bully and sometimes pleading for special status, you know, for old time's sake, banked foundational claims on immutable technological qualities. And it did so even as the dominance of a single technological film condition was disappearing, or, more dramatically, as historical work of the past few decades showed us that a secure and stable cinematic apparatus likely never existed. For film theory, even the term "apparatus" lent a false impression of technological fixity to what were otherwise powerful ideological critiques. One doesn't call something fluid an "apparatus." The trope of the quiet viewer, alone in the dark, in public, with only the flickering light occupying his or her field of vision, was, in the end, a wish, a beautiful expression of what was tasteful, or perhaps magical, in the constitution of relations among spectators, situations, and moving-image technologies. In this respect, the quest and demand for an ideal screening circumstance for motion pictures was partly a battle waged against the messy humanity of moviegoers with the weapon of technological determinism linked to aesthetic purity. The secret life of the cinephile is that of a technophile. Meanwhile, the electronics industry tumbles on, selling new consumer gadgets that arrive nestled in cardboard boxes and Styrofoam packaging. This industry operates oblivious to the scholarly peregrinations of a resolute faith in spectatorial ideals, except as they can be assimilated in their most basic renditions ("more cinematic") into advantageous promotional appeals.

It is easy to see how far the film screen has come from the dream of perfect cinematic conditions. Consider some recent innovations in "production screens," a long-standing category that has not received the full historical and critical attention it deserves. (Julie Turnock's contribution to this In Focus takes important steps toward addressing this lacuna). James Cameron did the motion-capture portions of *Avatar* (2009) with a "virtual camera," which was basically a handheld monitor on which he could watch the performers.[6] This screen was fed by a grid of a hundred high-definition (HD) cameras and, by moving it, he could record the camera work he desired, including pans, tilts, and tracking. No lens to look through, no actual tracks laid for camera movement, and no individual lighting setups. Shadows came later. On the one hand, this is a good example of what D. N. Rodowick observed as the reinstatement of an existing cinematic language even as the instruments are modified.[7] On the other, it moves the screen from the endpoint of spectatorship to the position previously occupied by the industry-standard motion picture camera.

For the live-action portions of *Avatar*, Cameron experimented with the "Simulcam." This allowed people on set to see, when looking through the camera eyepiece, takes with mock-ups of green-screen and motion-capture elements. A limitation to

6 On the camera systems used in *Avatar*, see Jody Duncan and Lisa Fitzpatrick, *The Making of "Avatar"* (New York: Abrams, 2010); and Jody Duncan, "The Seduction of Reality," *Cinefex* 120 (2010): 68–146.

7 D. N. Rodowick, *The Virtual Life of Film* (Cambridge, MA: Harvard University Press, 2007).



08 InFocus_143-174_CJ_51-2 cs3.indd 171 11/15/11 8:11:59 PM

shoots involving computer-generated images is the separation between filming personnel and digital craft workers, whose enhancements to the film appear much later. The Simulcam gives directors and directors of photography the ability to see a rough approximation of effects that will be integrated eventually, and thus they have an immediate basis for on-set decision making. Again, like the virtual camera for motion capture, one result is to reinforce an existing hierarchy of authority, such that directors and directors of photography effectively wrest back some control from the digital-effects departments and are emboldened in the digital filmmaking process. Notably, the Simulcam confounds distinctions we may have internalized as the approximate integrated image appears in the eyepiece and also on a synchronized monitor. Conventional definitions of monitor, computer, and camera are disrupted. The camera is a screen and the screen is a computer, and all are windows onto a live, virtual performance.

Given these features, which challenge some basic assumptions about our object of analysis, there is some advantage in sticking with the simplest notion of a screen—that a screen is a surface for animation. The variety of ordinary screen products and possibilities means we have to forget about measuring the "unusualness" of a screen by its distance from the flat rectangle of the theatrical environment. Barbara Klinger's and Haidee Wasson's observations about the term "nontheatrical," which sneaks in a stabilized notion of "normal" exhibition circuits, are instructive here.[8] Let us embrace the full implication of challenging presumptions about real, traditional, and proper screens, and crack through awkward boundaries between TV and not-TV, film and not-film, and computer and not-computer. The expanded, augmented, and future screens of database and installation art have already unsettled these categories, but then again so have tiny screens on the back of children's toy cameras, multiuse touchscreen electronic tablets, and automobile DVD players. Going further, we must take on the "minor" screen world of the interface on a credit card machine, the automated ticket machine at a movie theater, the portable gaming device, and the blinking roadside LED warning of construction ahead as well as those "major" sites of theatrical screens, HD television, and mobile computers. This is not to efface vastly different uses and engagements, but to draw attention to all the materials that organize our relations to signs, commerce, and each other, helping us to understand more fully what is at stake in making qualitative claims about one screen and not another. Further, we should work to ensure that Screen Studies does not become another way to prioritize visual culture, when ambient or amplified sound nearly always accompanies the glowing or reflected surface, whether through human dialogue or electronic beeps. In short, we must steer clear of an impulse to defend and police hierarchies of tasteful and artful screens—screens that reveal versus screens that conceal. Therefore, it is vital to see the continuity of processes and priorities of cultural life, and to recognize the fundamental instabilities that advanced capitalism injects into most aspects of the social and technological realm.

8 Barbara Klinger, "Cinema's Shadow: Reconsidering Non-theatrical Exhibition," in *Going to the Movies: Hollywood and the Social Experience of Cinema*, ed. Richard Maltby, Melvyn Stokes, and Robert C. Allen (Exeter, UK: University of Exeter Press, 2007), 273–290; Haidee Wasson, *Museum Movies: The Museum of Modern Art and the Birth of Art Cinema* (Berkeley: University of California Press, 2005), 35–36.



08 InFocus_143-174_CJ_51-2 cs3.indd 172 11/15/11 8:11:59 PM

In the 1950s, Roland Barthes wrote of the alchemy of plastic. Present everywhere and used for so many purposes, Barthes suggested that plastic effectively subsumed all other materials: "[T]he hierarchy of substances is abolished: a single one replaces them all: the whole world *can* be plasticized."[9] The ability to be shaped and reshaped into so many things, in so many places, became the core meaning of that particular synthetic chemical compound: "More than a substance, plastic is the very idea of its infinite transformation. . . . [I]t is ubiquity made visible."[10] Even with fuller knowledge of its environmental impact, plastic surely still holds this position as an elemental property of our constructed contemporary existence. But "ubiquity made visible" is now a resonant description of our current screen world, too. The potential adaptability of screens into any number of media, technological, and commercial operations seems limitless. Screens are the window displays for convergence, where we see the melding of film, broadcasting, and computers into hybrid media and commerce. Mobile and monumental, miniature and massive, screens are not exactly everywhere, but they offer up—they make *visible*—notions of ubiquity, adaptability, and utility. They are a stabilized part of how we expect to meet the future. Screens are our plastic. ✻

9 Roland Barthes, "Plastic" (1957), in *Mythologies*, trans. Annette Lavers (New York: Hill and Wang, 1972), 97–99.

10 Ibid., 97.



08 InFocus_143-174_CJ_51-2 cs3.indd 173 11/15/11 8:11:59 PM

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08 InFocus_143-174_CJ_51-2 cs3.indd 174 11/15/11 8:12:00 PM