

Conjuror's Box: Technology and Aesthetics in Postwar American Avant-Garde Cinema

By

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For Elsa, Liam, and Sabine

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Introduction
Conjuror's Box

"I'm not going to ask Picasso how he holds his brush and yet how many times have we been asked a question of how did we do a certain thing?... You know, I can tell someone I buy Pack printing or I do sandwich printing or I do a double exposure, but that isn't the answer. That isn't really why it looks that way."

–Shirley Clarke, in conversation with Storm De Hirsch, 1967¹

"*Audience*: What lighting and film stock did you use in the slaughterhouse sequence?
Hollis Frampton: Oh well, I had hoped that we stopped asking questions like that at Millennium some years ago."

–Hollis Frampton, during a Q&A at Millennium Film Workshop, 1974²

"People ask me for chemical formulas and whatnot, but I would rather not emphasize tech when it comes to the meaning and importance of my work. My friend Mark LaPore once said to me, after seeing an image of mine, 'Don't you ever tell me how you did that!' I think I prefer that kind of response."

–Phil Solomon, in conversation with Scott MacDonald, 2006³

The quotations cited above, from avant-garde filmmakers of three successive eras, indicate a strong resistance to describing or discussing matters of film technique. Why? As Frampton's quote suggests, "How did you do that?" was for many years the most frequently asked question on the avant-garde screening circuit. Understandably, artists bristle at the insinuation that their films can be reduced to "effects" deprived of context, expressivity, or meaning. Disregarding the more significant aesthetic and conceptual inputs that shape a film threatens to diminish the work as little more than a string of isolated "magic tricks." Another concern, implicit in the quote from Shirley Clarke, is that the avant-garde may ossify into a set of detachable techniques or visual conventions that quickly become clichés. By definition, an avant-garde loses its sense of purpose if it does not continually reinvent itself. Both of these fears are reinforced by filmmaker George Landow: "The particular techniques [used in *Bardo Folies* (1967)] were created for the film. I wouldn't like to see them become another thing like moving

camera or scratching film or any of these other techniques. In other words I don't want to separate the techniques from the intention of the film."⁴

Of course, "technique" and "technology" are intimately related. They share a root—"techne," often translated as "craft" or "art." According to Aristotle, "every art is concerned with bringing something into being, and the practice of an art is the study of how to bring something into being, and the cause of which is in the producer and not in the product."⁵ That is, both art and technical skill proceed by reasoning, with production or bringing-into-being as their ultimate objective. This correlation between "technique" and "technology" hints at another reason for filmmakers to be wary of discussing technique: fear of technological determinism. As is well known, the idea that technology determines artistic possibilities can mean that the artist's creative freedom is downplayed, as well as fail to account for other external forces, principally intermedial or cultural, that inform an artwork.⁶ Yet it is irrefutable that many avant-garde filmmakers were inspired by the constraints of film technology and productively engaged with them in generating films or ideas for films.

The pitfalls of technological determinism aside, technique and technology are major contexts for the aesthetic, institutional, and social history of the American avant-garde. In fact, this dissertation will argue that technology was as important as the Romantic, conceptual, political, mode-based, or intermedial influences that are usually cited. It will examine the role of technology in relation to other inputs without arguing for technological determinism—simply as an especially significant factor among many. It is important to note that not every filmmaker was reticent to comment upon technique. Larry Jordan, for instance, remarked: "I really enjoyed reading Harry Smith's interview in *Film Culture*, because he really got down to brass tacks and talked about technique; I know how hard that is to talk about, but it's the most interesting thing

to another film-maker.”⁷ But other filmmakers are not the only interested parties. Ultimately, I side with Jordan in the belief that it is possible to discuss technology and technique without reducing avant-garde films to technical tricks. On the contrary, knowledge about how and why films were made provides a fuller understanding of the contributions of the avant-garde to film and media history more generally.

For an example of this fuller understanding, consider some technological idiosyncrasies in the work of Stan Brakhage, often described as the most self-sufficient, intermedial, and Romantic of artists. Like most avant-garde filmmakers working in the 1960s to the 1980s, Brakhage shot almost exclusively on reversal film stocks. In editing, however, he refused to make a workprint, preferring to cut his original film. “When I got to [conforming] the original I would not be able to just match edge numbers,” Brakhage explained. “I would make another whole film.”⁸ Later in his career, Brakhage would sometimes shoot negative stock, but he would first print his footage at the lab and edit the resulting positive as though it were reversal, sometimes mixing it with other stocks over the course of a single film.⁹ When editing, Brakhage took a variety of approaches to the problem of visible splice marks in 16mm. In *Dog Star Man* (1961–64) and *The Art of Vision* (1965), he worked with the splices as formal parameters, but by the mid-1970s, he had adopted his customary practice of inserting one or two frames of black leader between every cut—an established method for filmmakers working in 16mm, but a dauntingly labor intensive technique for one who cut as frequently as Brakhage.¹⁰ One could argue that these technically detailed explanations of his working methods are of interest solely to Brakhage devotees, invisible to viewers, or not as consequential for understanding Brakhage’s films as more familiar paradigms, such as the influences of Modernist poetry, Abstract Expressionism, or theories of visual perception. In fact, I would argue the opposite: These

technical particularities tell us a great deal about film technology, aesthetics, and the ways in which viewers experience and appreciate cinema.

For instance, Brakhage's contention that he would feel compelled to make an entirely different film in the process of conforming an original suggests an expansive view of filmmaking in which images have dozens of potentially fruitful correspondences, and the art of editing is one of bringing out the most evocative resonances. This is a freedom unavailable to many narrative filmmakers, who are often bound by more conventional shot-to-shot logics. Moreover, Brakhage implies that the act of creation is inextricably linked to a moment of becoming, a contingent process subject to time, place, and the disposition of the filmmaker at the instant that he or she makes a splice; to have edited at a different time would be to make a different film. More concretely, Brakhage's use of processed color negative as "original" has a noticeable ramification: Because color negative is more susceptible to damage than reversal, negative dirt and yellow and green emulsion scratches are clearly visible and become important formal elements of films such as *Visions in Meditation #1* (1989) and *Boulder Blues and Pearls and...* (1993). Perhaps most consequential is the inclusion of two black frames at the edits, which not only hide the splices but soften the cuts, creating a rhythmic refreshment for the eye that relates directly to Brakhage's larger conceptual concerns, such as the nature of human vision and search for image-based equivalents to poetry.¹¹ In each of these examples, film technology enters into a complex relationship with aesthetics, theory, and the artist's working process.

As is evident from these descriptions, Stan Brakhage was particularly adept at turning technological constraints into productive elements of his films. But what do we mean by "constraints"? A more ideologically loaded near-synonym, "limitations," suggests that technology is forever falling short of some ideal, or that avant-garde filmmakers are always

striving to accomplish something that the technology cannot accommodate. Filmmaker Ken Jacobs is perhaps only half-joking when he observes, “It takes an exquisitely disturbed person to dwell on what they can’t do.”¹² In this dissertation, I use the term “constraints” to suggest both musicologist Leonard Meyer’s “hierarchy of constraints” and the specifically technological “limitations” of film identified by theorist Rudolf Arnheim.

Meyer defines constraints as a “repertory of alternatives from which to choose, given some specific compositional context,” which includes laws of perception and cognition, rules of musical style throughout an epoch, and stylistic strategies used by a group of composers or single composer.¹³ Applied to the avant-garde, this would encompass factors such as repetition and patterning within the work, as well as mode-based and authorial styles. On the other hand, Arnheim’s itemization of *technological* limitations includes aspects of film like the absence of color and the imposed perspectival system of the camera lens.¹⁴ Because film depends upon an interrelated set of complex devices to produce an image, it endures in both celluloid and digital forms as one of the most technologically circumscribed artistic mediums. Its technological constraints are mostly enforced by corporations to service an industry that the avant-garde often opposes.¹⁵ Some examples of these constraints include the intangibility of film once it is inside the camera, the length of a roll, the differing color palettes from stock to stock, the vagaries of film processing, and the flattened realism of high-definition digital video. In the chapters to follow, I will examine the ways in which a Meyerian set of constraints emerged out of an Arnheimian set of limitations. That is, in the cases of many avant-garde filmmakers, technological constraints furnish formal and conceptual challenges, encourage speculation about the particularities of the cinematic medium, and suggest action-based processes for filmmakers to explore.

Focusing on technology sheds light upon the working processes of avant-garde filmmakers, which are still not widely understood. Dozens of monographs in film and media studies outline the methods of narrative filmmakers, especially in relation to a studio system, but there are fewer analyses of avant-garde processes.¹⁶ Where do ideas come from? Are they rooted in action or concepts? What are the alternatives to capturing a profilmic event, legibly staging a scene for the camera, or creating an emotional dynamic between actors? Of course, there is a tremendous amount of diversity in the working processes of avant-garde filmmakers, but David Gatten suggests an intriguing avenue of exploration in his description of his own process:

I usually start by going into the studio and doing something physical—making an image or making a splice. This leads me to some research question, and then it's into the books, the library, thinking and writing. Then that sends me back out into the world to do something else with the camera, and those results inform the next round of research. Once I have a clear sense of my project, it becomes less about gathering and more about the relationship between a vision and the material resistance of the medium to actualize that vision.¹⁷

Although Gatten's process should not necessarily be applied to all filmmakers, his working methods illustrate the close connections between technology, a physical relationship with the medium, and concept-driven research into an area of interest. Repeatedly, we will encounter filmmakers examining the technological capacities of the medium and posing questions or devising procedures that have the potential to yield formally interesting results. This elevation of process is a central characteristic of the avant-garde's approach to filmmaking.

The following research questions animate this dissertation: How has technology shaped the aesthetics of avant-garde filmmaking? What are the filmmaking techniques and processes that emerged in relation to the particularities of the technology? What are the historical and cultural contexts out of which commercial technology made its way into the avant-garde? Were avant-garde filmmakers building an autonomous infrastructure, or were they navigating a system that

catered to other interests? How does technology force us to rethink central assumptions about avant-garde film and media history, including perceptual transformation of the image, debates about amateurism and professionalism, and the role of medium specificity? What is the relationship between imagination and constraint?

Technology, the Avant-Garde, and Film and Media History

Technology has been a focal point for film scholars, but nearly all of this scholarship has excluded the avant-garde. Seminal work by film historians such as Robert C. Allen and Douglas Gomery, Barry Salt, David Bordwell, Janet Staiger and Kristin Thompson, John Belton, James Lastra, and Lea Jacobs, among many others, has demonstrated the profound effects of technology on Hollywood filmmaking practices, including film editing and lighting, sound, and widescreen and color processes.¹⁸ Hollywood's relationship with technology has been particularly compelling not only due to its worldwide economic and artistic dominance, but because it has produced a group of powerful regulatory agencies that have delimited the possibilities of film technology, leading to a flexible yet authoritative set of artistic norms. Scholars have disagreed as to the degree of unity or clarity of objective among studio personnel in pursuing these norms, but there can be little doubt that institutions such as the Academy of Motion Picture Arts and Sciences and the Society of Motion Picture and Television Engineers negotiated technological innovation within a fairly circumscribed range of outcomes.

In many respects, the influence of technology on the avant-garde tells the opposite story: Its technology is often of the do-it-yourself (DIY), low-budget variety, developed in piecemeal fashion without strong regulatory mechanisms to shape its "norms." Moreover, most of these technologies were not specific to the avant-garde, but established for the commercial, industrial,

and amateur film markets. These sectors were less coordinated than the studio system, where most phases of technological development were systematized for maximum efficiency. Consequently, the key concepts that provide coherence to histories of studio technologies (such as “product differentiation” or “standards of quality”) are either non-existent or nebulous when applied to the avant-garde.¹⁹ Furthermore, the avant-garde often turns these technologies against their intended uses, subverting the rules as often as it adheres to them. In some cases, avant-garde filmmakers repurpose commercial technologies for their own ends; in other cases, they are forced to navigate an inhospitable system. In either instance, I argue that the avant-garde’s often idiosyncratic uses of technology are crucial in highlighting technology’s importance in shaping film and media aesthetics more broadly. It is often noted that the unconventional methods of certain avant-garde films instantiate some of the most fundamental debates in film theory because they foreground the very principles that narrative films frequently efface.²⁰ Similarly, these pages are full of examples of avant-garde films that demonstrate the aesthetic and cultural logics of film technology by accentuating them in surprising ways.

Much avant-garde film scholarship has also underestimated the contributions of film technology to aesthetics, instead focusing upon the importance of mode-based or intermedial influences. The most predominant organizing principle for most surveys of avant-garde cinema, including those by Sheldon Renan, David Curtis, P. Adams Sitney, and A.L. Rees, has been an emplotment of avant-garde film history as a series of exchanges among films made in different modes: lyrical/poetic, pop/Underground, minimal/Structural, found footage/collage, and handmade/graphic.²¹ Sometimes these modes are presented as dialectical, with one mode incorporating another and pushing it in unexpected directions. In other instances, modes are held to be oppositional, with filmmakers and film scholars pitting them against one another, most

famously in the contention that Structural Film revises or “corrects” the perceived shortcomings of the lyrical film. Scholars such as Malcolm Le Grice, Peter Gidal, William Wees, and James Peterson have contributed volumes analyzing some of these modes in detail.²²

Other scholars, most notably Gene Youngblood, R. Bruce Elder, James Peterson and P. Adams Sitney (again), and Gregory Zinman have suggested that intermediality is the predominant influence on avant-garde aesthetics.²³ For instance, Youngblood links the avant-garde to computer films, television experiments, and paracinematic performance. Elder and Sitney trace the influence of literature and poetry on the avant-garde, while Zinman thoroughly explains the many connections handmade cinema shares with the other arts. Consequently, a tremendous amount of valuable scholarship has identified and enumerated the affinities between avant-garde filmmaking and poetry, literature, music, and the graphic, plastic, and visual arts.

Many of these mode-based and intermedial inputs, however, were themselves shaped by film technology. Consider two examples:

—Stan Brakhage’s *Scenes from Under Childhood* (1967–70) is a complex translation of Olivier Messiaen’s musical ideas to visual imagery, but Brakhage’s modal treatment of color was equally inspired by a processing machine purchased by his lab that was capable of performing a large number of light changes in a short period of time.²⁴ In this instance, intermedial and technological concerns inform each other.

—J.J. Murphy’s *Print Generation* (1973–74), for which the filmmaker printed fifty successive dupes of a one-minute film loop, is emphatically Structural in its organization, but the deterioration of the emulsion over generations produces a Pointillist reverie in keeping with films in the lyrical mode. Here, Murphy exploits the technology to produce a mixed-mode work.

These examples suggest that a technological approach contributes to a more nuanced understanding of the relationships between films made in different modes and film and the other arts.

A more recent development in avant-garde film scholarship is the emergence of an “institutional turn” that examines neglected topics such as distribution, exhibition, and the avant-garde’s relationships with outside institutions, including Hollywood, the art world, and academia. The important contributions of scholars such as David E. James, Scott MacDonald, Michael Zryd, Erika Balsom, and the organizers of the regionally specific *Radical Light* and *Alternative Projections* projects have demonstrated the value of this approach. Some of this work has focused upon semi-autonomous institutions like Cinema 16, Canyon Cinema, and the Film Department at SUNY-Binghamton, where intrepid luminaries improbably carved out a viable space for the avant-garde to flourish.²⁵ In this dissertation, I situate the avant-garde in relation to a wide variety of non-Hollywood filmmaking practices that have gone mostly unexamined in film and media studies, including amateur cinema, journalism, pornography, sports broadcasting, and an array of services ancillary to the industry. Technology is especially significant because it provides a complex view of the avant-garde as both autonomous and dependent. The ingenuity of the avant-garde was not simply in creating its own infrastructure that allowed it to exist alongside other filmmaking modes, but in co-opting the infrastructure put in place to service these other modes. Therefore, this dissertation opens a window onto a resourceful postwar generation of artists, amateurs, tinkerers, and prosumers who entered into complex negotiations with a massive technological infrastructure in pursuit of their own alternative visions of cinema.

Visual Transformation, Amateurism vs. Professionalism, and Medium Specificity

Apart from the fact that it is understudied, how does technology grant scholars a new perspective on avant-garde film history? In addition to the contributions already highlighted, I will argue over the next four chapters that technology pertains directly to several paradigmatic issues that have characterized the discursive and aesthetic history of the avant-garde, namely the perceptual transformation of the image, evaluative debates about the benefits and detriments of amateurism and professionalism, and the role of medium specificity in avant-garde filmmaking. These topics deserve some preliminary elaboration.

Technology provides an avenue for rethinking perceptual transformation of the filmic image, an idea so central to avant-garde filmmaking practice that it is often taken for granted.

William C. Wees provides a list of the most common avant-garde visual techniques:

Superimposition, prismatic and kaleidoscopic images, soft focus, unusual camera angles, disorienting camera movement, extreme close-ups, negative images, distorted and totally abstract images, extreme variables in lighting and exposure, scratching and painting on the film, slow motion, reverse motion, pixilation, time-lapse photography, quick cutting, intricate patterns of montage, single-frame editing, and flicker effects.²⁶

Wees then enumerates the interpretive protocols that have been applied to them:

As gestures of rebellion against the conventions of popular cinema, as typical shock tactics in the avant-garde's campaign to *épater les bourgeois*, as formalist methods of defamiliarization, as new visual codes substituted for the traditional codes of narrative and representation in cinema, as expressions of psychological states and symbolic meanings, as experiments to determine the formal properties of film, as ways of demystifying the medium and foregrounding its materials and processes of production.²⁷

This is a thorough list, but it should be noted that accounts of avant-garde film practice often fall short of explaining the genealogies or implications of particular techniques with any degree of specificity.

To take a single example from Wees's list, there are multiple methods for making superimpositions. A filmmaker could execute them in-camera by determining exposure, shooting a number of frames, winding the film back in the camera, re-calibrating exposure, and shooting another image (often the same number of frames), understanding that the superimposition will register most strongly in lighter portions of the image (see Chick Strand, *Angel Blue Sweet Wings* (1966)). A more expensive but less restrictive method would be to instruct the film lab to print multiple rolls of film over each other in separate passes, a procedure called multiple-roll printing (see Bruce Baillie, *Roslyn Romance (Is It Really True?)* (1977)). More recently, a filmmaker could arrange any number of images in stacks in the timeline of a digital editing program and precisely adjust the opacity of each layer to within a tenth of a percentage (see Leighton Pierce, *The Back Steps* (2001)). These methods are only roughly equivalent. Depending upon the method used, the aesthetic contours of the superimposition will be very different, as will the historical, economic, and even political factors that inform its use. For instance, the multiple-roll printing of *Roslyn Romance* suggests a dense weaving of images sliding in and out of alignment, while *The Back Steps* combines 24 layers in a seamless digital composite to evoke the fleetingness of time. Consequently, a more nuanced understanding of the specificities of individual techniques in the first part of Wees's list bears directly upon the interpretations proffered in the second.

More broadly, this dissertation will track the historical evolution of visual innovation in the avant-garde from in-camera and editing techniques to "post-production" methods of revision and reworking, which were enabled by technological factors such as optical printing, increased proximity to lab technicians, and prosumer digital editing software. Influenced by the prewar avant-garde's roots in Dada, Surrealism, and slapstick, the first generation of post-war American

avant-garde filmmakers (including Maya Deren, Sidney Peterson, James Broughton, Curtis Harrington, early Kenneth Anger, and others) transformed their images through more intensive application of the shooting and editing techniques that film scholars associate with Georges Méliès. In many cases, their goal was a kind of lightly Surrealist mise-en-scène, with non-rational or absurdist images arranged with a loose sense of causality. In terms of mise-en-scène, their films feature expressive and exaggerated performances, mannequins and dummies, strange props, and actors doubled in the frame. Profilmically, there is an abundance of embodied camera movement, anamorphic lenses and mirror distortion, inversion, slow and fast motion, pixilation, and in-camera superimposition.²⁸ Their edits are often disjunctive and fragmented, with heavy emphasis on techniques such as substitution splicing, graphic matching, and the playful disruption of spatial and temporal continuity.

In many respects, Sidney Peterson's *The Cage* (1947) is representative. The film tells the story of a painter who removes his own eyeball and chases it through the streets of San Francisco. In terms of visual innovation, *The Cage* boasts grotesque pantomime with the disembodied eye (which ricochets off a bird, gets caught in a mop and a mouth, and is skewered on a hatpin), slow motion rendering of the chase, and many in-camera superimpositions of the eye over the city. The film also features reverse motion (paint is squirted back into a tube and people shuffle down the street backwards), substitution splices (the bread pops into a hand and the doctor disappears), and the supremely Surreal depiction of the act of painting a piece of bread before eating it. Most famously, anamorphic lenses depict the eye's point-of-view as it rolls down the sidewalk. As P. Adams Sitney remarks, "Peterson attempted so many things that the film is much more interesting than it is successful."²⁹ Even if one disagrees with Sitney's critical judgment, the sheer number of techniques used in *The Cage* renders it a kind of catalogue of

profilmic and editing techniques utilized by early postwar avant-garde filmmakers to transform their images.

Now consider Barbara Hammer's *Optic Nerve* (1985), a film made four decades after *The Cage* that also attempts to depict the point-of-view of a damaged eye as it encounters the world. Hammer's film uses diaristic footage of the filmmaker moving her elderly grandmother into a nursing home as raw material to be submitted to a barrage of rephotography techniques that serve as corollaries for her grandmother's impaired eyesight. In contrast to *The Cage*, this film features pulsating alternation between red and green filters, jittery misregistration of the image, two images printed together, single-frame images (created through rephotography, not editing), freeze frames, duplication of successive generations of footage to emphasize degradation and grain, and the visual depiction of a Super-8 filmstrip pulled through the projector gate. *Optic Nerve* is as much a repository of available techniques in the 1980s as *The Cage* is for the 1940s, with the significant difference that Hammer's visual transformations were applied in processing and on the optical printer after the material had been shot. In this case, it is impossible to discuss the editing as separate from the rephotography, which qualitatively remodels the images in the stage that narrative filmmakers would dub "post-production."³⁰ Describing the technological innovations that motivated the shift from shooting and editing to rephotography, processing, and other post hoc techniques will be a central contribution of this dissertation.

My descriptions of *The Cage* and *Optic Nerve* propose the idea of a visual vocabulary specific to avant-garde filmmaking. This has been a problematic notion for a mode of art-making that is continually searching for new ways of visualizing the medium and the world. Historically, this concern has been manifested in the fear that the academization of experimental filmmaking has led to an ahistorical situation in which the avant-garde is reduced to a series of techniques

that aspiring filmmakers will uncritically and superficially apply to their own films. For example, critic Fred Camper has worried that the teaching of technique inevitably diminishes the avant-garde by representing it as a series of rational choices, whereas truly vital work is produced by tapping into “the potentially chaotic realms of the imagination and the subconscious.”³¹ Camper elaborates:

Questions of f/stop, hand-held camera or tripod mounting, film stock, editing methods, and even the type of camera and splicer used, have emotional and ethical dimensions, and must ultimately be made instinctively, as a poet might choose words or phrases: with all manner of thought possibly going into the choice except for the kind of calculation one would derive from a filmmaking manual or a grammar book, if the work is to be vital, original, and alive... The teaching of avant-garde film technique (an oxymoronic phrase in itself!) is also a recipe for the end of avant-garde film.³²

Despite Camper’s anxiety, there is a rich tradition of how-to manuals and guidebooks written by avant-garde filmmakers that aim to teach experimental filmmaking techniques. Some of the most celebrated examples include Stan Brakhage’s *A Moving Picture Giving and Taking Book* (1966), Lenny Lipton’s *Independent Filmmaking* (1972), Bastian Clevé’s *The Art of Personal Filmmaking* (1989), Helen Hill’s *Recipes for Disaster* (2001), and Bill Brown’s *Action!: Professor Know-It-All’s Illustrated Guide to Film and Video Making* (2012).³³ Most recently, Kathryn Ramey’s *Experimental Filmmaking: Break the Machine* (2015) schools aspiring filmmakers in low-budget optical printing, hand processing, glitch, and other DIY methods for visual transformation.³⁴ In fact, technical and technological advice has always been an essential component of the avant-garde filmmaking community, disseminated in private, among friends and colleagues, in workshops at cooperatives and media centers, in University and college courses, in publications such as *Canyon Cinemanews* and *Filmmakers Newsletter*, and online through discussion groups such as FrameWorks.³⁵ While pedestrian applications of shopworn techniques will usually fail to inspire, teaching the history and methods of the avant-

garde's radical approach to technology has been an important component of its legacy and ongoing viability. Phil Solomon recalls his undergraduate years studying with Ken Jacobs at SUNY-Binghamton and "saying something like, 'Do you think one can really *learn* this kind of cinema?'" And, with one eyebrow raised, [Jacobs] said, 'Well, what do you think I'm *doing* here?'"³⁶

In addition to visual transformation, technology also forces us to reconsider the evaluative debates about amateurism and professionalism that have animated the avant-garde since its beginnings. In his advocacy for a New American Cinema in 1959, Jonas Mekas denigrated technical polish, casting a lo-fi aesthetic as a marker of cinema free from the restrictions of Hollywood. In a series of passionate articles published in *Film Culture*, Mekas wrote, "Hollywood films ... reach us beautiful and dead. They are made with money, cameras, and splicers, instead of with enthusiasm, passion, and imagination. If it will help us to free our cinema by throwing out the splicers and the budget-makers and by shooting our films on 16mm. as Cassavetes did, let us do so."³⁷ A year later, he pushed further, drawing a firm line in the sand: "The New American film maker seeks to free himself from the over-professionalism and over-technicality that usually handicaps the inspiration and spontaneity of contemporary cinema, guiding himself more by intuition and improvisation than by discipline."³⁸ "We don't want rosy films," Mekas proclaimed. "We want them the color of blood."³⁹

Mekas's call to arms, published concurrently with critic Manny Farber's famous distinction between White Elephant Art and Termite Art, poses an adversarial dichotomy between the polished and self-important and the alive, spontaneous, and vital, which persists both because of and in spite of its technical crudity.⁴⁰ For Mekas, technical polish was a bourgeois value, indicative of the kind of generic "good taste" that might lead someone to

describe a work of art as “nice” or “pleasant.” In a broadly influential polemic (still evident in Camper’s writing 25 years later), technique was posited as the enemy of passion, intuition, and feeling. Viewed in its proper historical context, Mekas’s call to arms was liberatory, freeing filmmakers to pursue their ideas with whatever means were at their disposal. His radical suggestion was that an aspiring filmmaker did not need to possess a set of specialized technical skills—what mattered was passion, the drive to create, and the ability to imagine alternative methods of filmmaking. Many filmmakers shared Mekas’s enthusiasm. For instance, Maya Deren wrote:

Don’t forget that no tripod has yet been built which is as miraculously versatile in movement as the complex system of supports, joints, muscles, and nerves which is the human body, which, with a bit of practice, makes possible the enormous variety of camera angles and visual action. You have all this, and a brain too, in one neat, compact, mobile package. Cameras do not make films; film-makers make films.⁴¹

Similarly, Chick Strand exhorted: “You just learn how to use the tools and let them work for you, I guess. You don’t have to be a technician. You don’t want to know how the lens works and all the elements in there. You don’t have to want to remember ASAs and stuff.”⁴²

Ironically, the qualities that Mekas and Strand considered virtues were the very qualities that their critics most despised. Respected film critic Arthur Knight declared the New American Cinema to be filled with “anti-filmmakers,” insisting that “technically, they may be accused of sheer incompetence.”⁴³ Stan Brakhage and Andy Warhol were frequent targets of scorn and derision. Ernest Callenbach levied the charge that “Brakhage’s films have a curious air of haphazard and stunted work, almost of laziness; they impress as pretentious ‘home-movies.’”⁴⁴ Similarly, Eugene Archer wrote of *Anticipation of the Night* (1958) that “the audience will see only the feet of the actors and the tops of their heads, blurred faces and out-of-focus scenery, wobbly camera movements and lopsided distortions, pieced together in a continuity that makes

no sense of any kind.”⁴⁵ A critic for the *New York Times* described Warhol’s approach to his camera and sound equipment as “infantile,” observing that, “one of his favorite tricks—a parody, one assumes, of slick-movie technique—is to zoom in on some completely irrelevant part of the scene. Two or three times, it is a funny device; after that it gets to seem like a nervous tic.”⁴⁶ Confronted with Warhol’s restless zooming and murky sound recording and Brakhage’s wildly gestural camera (to say nothing of Jack Smith’s overexposed Bacchanalia in *Flaming Creatures* (1963) or the trash Hollywood parodies of George and Mike Kuchar), these critics saw incompetence, but Mekas and his allies saw vitality.

Mekas proved correct in his insistence that lo-fi did not preclude aesthetic interest. That said, while his dichotomy served its polemical purpose, the reality was always more complicated. In truth, Brakhage’s technical standards were extremely exacting. To cite one example, consider his admission that, “I have left *Dog Star Man: Part I* at Palmer Labs because their particular processing, etc., produces a print which is (HOW shall I describe something so subtle?), well, ‘colder,’ ‘slicker,’ of a ‘polished density’ which seems appropriate to THAT particular part of *DSM*.”⁴⁷ In other words, Brakhage has compared the particularities of film processing at Palmer Labs (located in San Francisco) with those of his usual lab, Western Cine (in Denver), and has decided that the nuances of Palmer’s processing are better suited to one specific part of a five-part film. Pace Callenbach, this does not smack of haphazardness or laziness. As J.J. Murphy has argued, Warhol’s technical “mistakes” were an elaborate and deliberate component of his filmmaking aesthetic—the “flares, punch marks, processing mistakes ... and conventionally awkward camera placement” were not the result of apathy but an understanding of the technology canny enough to realize that accidents could be revealing.⁴⁸ In an extremely different vein, Peter Kubelka’s quest for an articulate cinema demonstrates a rigorously precise approach

to filmmaking that would be impossible to achieve without careful attention to each frame.⁴⁹

This legacy was handed down to the next generation when the founding members of the New American Cinema became teachers. At UCLA, Shirley Clarke told her students to splurge in post-production, as it was a mark of pride to produce work that had been prepared with care and quality.⁵⁰

The tendency for filmmakers to possess extreme technical refinement only increased in the 1970s and 1980s. As Julie Turnock has demonstrated, CalArts served as a training ground for cutting-edge optical printing techniques in this period, and artists like Pat O'Neill, John and James Whitney, and Betzy Bromberg were so technically accomplished that they taught filmmakers like George Lucas and Steven Spielberg "strategies for organizing and mobilizing elaborately designed composite *mise-en-scène*."⁵¹ It is common to speak in hushed and reverent tones about the masterful cinematography of filmmakers like Robert Beavers, Peter Hutton, and Nathaniel Dorsky, who use natural light and Bolex cameras to create images of consummate artistry. Reviewing a recent Dorsky program, critic Manohla Dargis notes that his shots are of "rare and startling beauty," encouraging viewers to "luxuriate in the visual complexity of the images."⁵² In recent years, Margaret Honda has produced a series of cameraless films in 35mm and 70mm that involve working closely with FotoKem, a major lab in Los Angeles, on elaborate experiments in film processing. Of course, filmmakers such as Leslie Thornton, Craig Baldwin, and Luther Price have pursued a rougher aesthetic, but, like Warhol, their films prove that lo-fi does not correspond to lack of sophistication.

Technology provides a framework for re-examining the debate between amateurism and professionalism, cutting through discourses of authenticity to reveal a marginalized group of film artists with prodigious technical prowess. Because avant-garde filmmakers are often responsible

for every aspect of their films, from shooting and editing to optical printing and lab work, many possess a technical knowledge that rivals anyone in Hollywood, where production tasks are strictly specialized. Moreover, the avant-garde's penchant for unconventional uses of technology necessarily entails a detailed understanding of how film technology is *supposed* to work.

Whether polished or coarse, I argue that avant-garde filmmakers strived for technical expertise as much as filmmakers working in other modes, proving the adage that one breaks the rules by knowing them intimately, not by disregarding them altogether. *Conjuror's Box* will shed light on the undocumented history of technological sophistication at the heart of a vigorous, amateur-driven radical cinema.

Much of the language used in this Introduction—"material properties," "physical components," "medium's constraints"—suggests medium specificity, a cornerstone of avant-garde film history and scholarship that has recently come under overdue scrutiny. Medium-specificity arguments are a central component of Modernist thinking about the arts and formed the dominant paradigm of classical film theory from Arnheim to Bazin.⁵³ The distinctive mix of reflexivity, anti-illusionism, and materialism that constitutes the 1970s-era avant-garde's fixation on the materiality of the medium, however, is most strongly indebted to Clement Greenberg. In "Towards a Newer Laocoön," Greenberg argues that "purity in art consists in the acceptance, willing acceptance, of the limitations of the medium of the specific art."⁵⁴ The standard story of the cinematic avant-garde (especially the mode that came to be called Structural or Materialist Film) is that artists such as Tony Conrad, Michael Snow, Hollis Frampton, Paul Sharits, and many others, reduced films to their most essential components by stripping away other parameters, especially narrative. Consequently, their films foregrounded and investigated some aspect of the medium's materiality or ontology. Later in the decade, British Structuralists such as

Malcolm Le Grice and Peter Gidal emphasized the mode's political underpinnings, arguing that Structural or Materialist films were anti-illusionistic, encouraging an active viewing position that resisted the trappings of dominant ideology.⁵⁵

In recent years, the concept of medium specificity has been productively criticized by film theorists and scholars of the avant-garde alike. In terms of the former, Noël Carroll has argued in a series of essays that film theory should “forget the medium,” noting that film is a hybrid medium irreducible to a single essence.⁵⁶ D.N. Rodowick offers an alternative definition of a medium as “comprised of distinct components, which could in fact be physical, instrumental, and/or formal,” insisting that a medium should be distinguished from its physical support and channel of transmission.⁵⁷ Within avant-garde film scholarship, Jonathan Walley has pointed to the problematic example of paracinema to suggest that the medium “is not a timeless absolute but a cluster of historically contingent materials that happens to be, for the time being at least, the best means for creating cinema.”⁵⁸ Similarly, Gregory Zinman's survey of handmade cinema aims to “set aside a strict notion of medium and instead, to examine the specific art practices and philosophies that inform handmade moving images.”⁵⁹ In all of these instances, scholars usefully abandon the injunctive or prescriptive idea that film has a unique, determinative essence that should set limits on what artists can and cannot do.

In emphasizing the technology of film and video, I am not advocating a return to medium specificity, especially in its essentialist guise. While I am in accordance with Carroll's anti-essentialism and opposition to injunctive argument, I cannot simply “forget the medium,” as he suggests; the material components of filmmaking are not irrelevant to how they may be perceived or appreciated. Instead, I side with Rodowick's assertion that “it should still be possible to invoke the concept of a medium in ways that are not reducible to arguments

concerning essence, teleology, and injunction.”⁶⁰ As Rodowick points out, a “medium” is still a viable and useful concept granted that it is conceived flexibly, less as a homogeneous substance than as “a set of component properties or conceptual options.”⁶¹ This dissertation will explore some of these properties and options, specifically material, technological, and formal, as they have informed avant-garde filmmaking, claiming that formal innovation was often, although not always, conceived in relation to some of the constraints and possibilities of film and digital video as mediums, although no essentialist or injunctive arguments should be implied.

As I have suggested, many of these theoretical concerns about the medium are refracted through a Greenbergian prism in the history of the avant-garde, raising a cluster of concerns about reflexivity, materialism, and anti-illusionism. How will this account differ from the standard version of avant-garde cinema, articulated in 1976 by Whitney curator John G. Hanhardt as the story of a cinema that “subverts cinematic convention by exploring its medium and its properties and materials, and in the process creates its own history separate from that of the classical narrative cinema”?⁶²

Although I examine the influence of technology on aesthetics, I do not argue that the films under discussion necessarily reject the forms or traditions of art in other media nor posit the material investigation of the cinematic medium as their *raison d'être*. There are very few films, for instance, that are principally or solely *about* optical printing or film processing. Instead, I focus on the role of these technologies in shaping film form, guiding working processes, and, in some cases, constraining options. In a few cases, technology informs the thematics of the films, but this is not the glue that holds the argument together. Consequently, *Conjuror's Box* will not provide an argument about reflexivity or anti-illusionism. While some avant-garde films could broadly be called “reflexive,” this is not the function or conceptual endgame of most of the films

discussed in the chapters to follow. Additionally, I place a heavy degree of emphasis on the cultural history of technology, examining the circuitous path along which low-budget film technology traveled, charting its intersections with amateur and semi-professional markets and noting the variety of ways that it was exploited by avant-garde filmmakers. Therefore, my view of technology is not tied to ontology, but simply describes a set of historically situated and contingent practices that were employed in different filmmaking contexts.

How does technology encourage a revision of the medium-specific tradition in avant-garde cinema? Like the work of Jonathan Walley and Gregory Zinman, this dissertation claims to reconsider medium specificity, but instead of analyzing ontologically ambiguous traditions—paracinema, handmade cinema—I examine the use of technology in an array of canonical avant-garde films, arguing that technology plays a decisive role in films that fit outside of the reflexive or Structural Film paradigms. In this view, Structural Film becomes less monolithic or dominating, and more a reflexive application of technologies that affected all filmmakers, no matter the mode in which they worked. The examples represent a wide array of films and videos in the avant-garde tradition, not solely those that foreground aspects of the medium. Many of the filmmakers whose work is analyzed, including Phil Solomon, Barbara Hammer, Janie Geiser, Nathaniel Dorsky, and others, have a profound engagement with technology, but their films do not call attention to this relationship in ways that would traditionally be considered “reflexive.” These examples encourage us to view materiality in the avant-garde as more than a medium-specific parameter that can be used for anti-illusionistic purposes, but as an aspect of avant-garde cinema that functions differently depending upon the relevant contexts.

Chapter Breakdown

This dissertation examines four technologies that have been particularly consequential for avant-garde filmmakers: 16mm film, film labs, optical printing, and digital production technologies. Although each is addressed separately, they are in fact interrelated, so relevant aspects of each technology will be discussed throughout each chapter. In terms of methodology, the histories of these technologies have been reconstructed through archival research, interviews with filmmakers, and publications devoted to avant-garde and amateur cinema. Each chapter features both analyses of individual films and extended case studies devoted to a single artist.

Chapter 1, “Her Fragrant Emulsion,” investigates the role of 16mm film in shaping avant-garde aesthetics. While the avant-garde has always been closely associated with 16mm, some of the medium’s inherent constraints became focal points for aesthetic exploration and disruption. Specifically, this chapter looks beyond handmade cinema and the Structural/Materialist paradigm to examine the contributions of the “minor cinema” generation to the filmstrip. The painterly images of Peter Hutton and Nathaniel Dorsky provide examples of filmmakers incorporating the particularities of specific film stocks into their aesthetic projects. The fact that emulsion decays serves as the impetus for a politicized use of the strip evident in films by David Gatten, Jennifer Reeves, Naomi Uman, and Peggy Ahwesh, who adopt ecological and feminist approaches to their materials. Phil Solomon extends emulsion decay into the realm of personal filmmaking, mining the strip’s capacity for autobiography, allegory, metaphor, and elegy. And the battered cinema of Luther Price demonstrates some of the ways in which filmmakers have combated the inherent linearity and intangibility of the filmstrip by connecting it to their own bodies.

Chapter 2, “The Fourth Watch,” details the relationship between filmmakers and film labs. Unlike the optical printer, which marks an instance of avant-garde filmmakers appropriating commercial technologies for their own ends, the culture of film labs was one that needed to be navigated and negotiated. An account of the undocumented history of the independent lab business in New York discovers that the avant-garde was imbricated within a host of other non-Hollywood filmmaking markets, including journalism, sports broadcasting, and pornography, a link which prompts a reevaluation of the censorship debates that plagued the avant-garde in the 1960s. This chapter also offers a survey of common lab procedures used by avant-garde filmmakers and assesses the similarities and differences from those used by more conventional filmmakers, shedding light on the amateurism vs. professional debate. Examples are drawn from films by Larry Gottheim, Carolee Schneemann, Henry Hills, Keith Sanborn and Peggy Ahwesh, Nathaniel Dorsky, Lewis Klahr, Janie Geiser, M.M. Serra, Peter Hutton, and David Gatten. Extended case studies focus upon the unique relationship between Stan Brakhage and his lab, Western Cine, and films by Morgan Fisher and J.J. Murphy that posit the lab’s role in the filmmaking process as their subject.

Chapter 3, “Regeneration,” provides a history of low-budget optical printing. The optical printer was a rephotography device used almost exclusively by the Hollywood studios until the 1970s, when DIY printers became a staple of the avant-garde curriculum. This chapter describes the advanced amateur network of experimental filmmakers, tech gurus, tinkerers, and inventors out of which the most widely used printer, the JK optical printer, arose. It also offers an inventory of visual strategies used by the avant-garde in rephotography, arguing that the optical printer helped to reimagine visual transformation by shifting image modification processes from shooting to post-production. Many of the optical printer’s constraints, including its emphasis on

the single frame, were brought into line with extant avant-garde filmmaking paradigms. This chapter also argues that the optical printer appealed to filmmakers working in a variety of modes, including analyses of films by Craig Baldwin, Standish Lawder, Caroline Avery, Peter Rose, Ken Kobland, Su Friedrich, and Martin Arnold. Additionally, extended case studies of the work of Pat O'Neill and Barbara Hammer address issues of perceptual transformation, nature and technology, affect, and tactility in relation to their work with the optical printer.

Chapter 4, "The Task of the Translator," examines the avant-garde's assimilation of digital production technologies. Digital presented an identity crisis for the avant-garde by threatening to supplant all of the technologies discussed in earlier chapters. While detailing the significant changes to working process that this transition precipitated, this chapter demonstrates the resiliency of the avant-garde by examining the methods filmmakers developed to incorporate new technologies into abiding formal traditions. A survey of posts made to the FrameWorks listserv between 1996 and 2011 serves to establish the two overriding constraints of digital video: its bias for crisp, hyper-real images and its immateriality. In deliberate symmetry with Chapter One, Leighton Pierce's videos provide examples of a painterly aesthetic in digital, substituting film grain for slow shutter speeds and image layering in non-linear editing software. Peggy Ahwesh and Phil Solomon's use of video game imagery represents a surprising extension of the found footage tradition that locates an uncanny poeticism and complicated gender politics in immersive digital worlds. This chapter also analyzes David Gatten's shift to digital to augment the emphasis on materials and surface that animated his film-based work.

As with any project of this scope, there are some regrettable omissions and necessary caveats. 16mm and digital video provide the foundation for this study because they were so widely adopted by avant-garde filmmakers. Other important formats, especially 8mm, Super-8,

and analogue video are subjects for future research. I also omit technologies such as PixelVision, slide projectors, and the materials used in projection performance, which are significant but less foundational.⁶³ Digital technologies are undoubtedly revolutionizing the distribution, exhibition, and social networks of avant-garde cinema, but I focus upon digital as a production technology. In terms of organization, I try to adhere to a rough sense of chronology within each chapter, but there is a good deal of temporal overlap and minor chronological reorganization for the sake of argumentation. It perhaps goes without saying that restrictions of space prevent me from discussing all of the artists that have innovated in their uses of technology. This is not an historical survey of the avant-garde, so the filmmakers included represent a highly selective sample. In the same vein, I have limited my study to the American avant-garde to keep it manageable, but film technology and avant-garde cinema are both international in scope with permeable boundaries; the history of film technology and its impact on the avant-garde in an international context remains unwritten.⁶⁴ Finally, my emphasis on the role of technology in shaping filmmakers' working processes leads me to rely upon personal interviews and artist statements to make some of my claims. I have attempted to preserve a sense of the artists' intentions without foreclosing the possibility of unintended consequences, alternate readings, and multiplicity of meanings. The degree to which I have succeeded is left for the reader to judge.

In recent years, technology and avant-garde cinema have reasserted themselves as topics of major concern in the field of film and media studies. The digital revolution has inspired renewed interest in technology, particularly with regard to the analogue-era continuities that inform contemporary digital practices. Meanwhile, avant-garde film and video has re-emerged as a vibrant mode for young filmmakers. In film culture at large, from festivals to publications, experimental media has come to occupy a central role, mixing freely with documentary,

international art cinema, and independent narrative filmmaking. *Conjuror's Box* stakes its claim at the heart of these emerging trends, salvaging an analogue film culture on the verge of extinction and demonstrating its relevance for film and media studies in the contemporary moment. The following account of technology and avant-garde cinema will offer a model for considering technological change, film form, and stylistic tradition that has broad application to film and media history. By paying close attention to films and videos that use technology in an unorthodox way, the field can better understand exactly how that technology works, and how artists use it to provide viewers with novel and arresting cinematic experiences.

¹ Shirley Clarke and Storm De Hirsch, "A Conversation—Shirley Clarke and Storm De Hirsch," *Film Culture* 46 (Fall 1967): 53.

² Hollis Frampton, "Three Talks at Millennium," ed. Tony Pipolo, *Millennium Film Journal* 16–17–18 (Fall/Winter 1986–87): 282.

³ Phil Solomon quoted in Scott MacDonald, "Interview with Phil Solomon," in *A Critical Cinema 5: Interviews with Independent Filmmakers* (Berkeley, Los Angeles, and London: University of California Press, 2006), 212.

⁴ George Landow quoted in P. Adams Sitney, "Interview with George Landow," *Film Culture* 47 (Summer 1969): 11.

⁵ Aristotle, *The Nicomachean Ethics*, trans. J.A.K. Thomson, further revised ed. (London and New York: Penguin, 2004), 149.

⁶ "Technological determinism" as a critical approach has been pervasive enough to be included in an introductory film studies textbook as a noteworthy but problematic paradigm. See Jill Neldes, ed., *Introduction to Film Studies*, 5th ed. (Abingdon, UK: Routledge, 2012), 46.

⁷ Larry Jordan quoted in P. Adams Sitney, "Larry Jordan Interview," *Film Culture* 52 (Spring 1971): 88.

⁸ Stan Brakhage, "How They Were Loving I Think Everything Should Be Seen: Stan Brakhage at Millennium Film Theatre, NYC, February 19, 1972," *Millennium Film Journal* 47–49 (Fall 2007/Winter 2008): 13. Reversal stocks produced a positive image, which made them a popular choice among 16mm filmmakers in the 1960s and 1970s. Although almost all avant-garde filmmakers used reversal stocks in this period, it was common to edit a workprint and then conform the original by matching the edge numbers.

⁹ For more on this practice, see Mark Toscano, "Stan Brakhage's Two Negatives," *Preservation Insanity* (blog), February 24, 2012, <http://preservationinsanity.blogspot.com/2012/02/stan-brakhages-two-negatives.html/>.

¹⁰ Because cement splicing 16mm film entailed overlapping of frames at the edit, splices would often be visible in projection. Lenny Lipton describes the black-frame method of producing invisible splices in Lipton, *Independent Filmmaking* (San Francisco: Straight Arrow Books, 1972), 61–63. As will be discussed in Chapter 1, it became more common for filmmakers to shoot on negative stock in the 1980s.

¹¹ For instance, R. Bruce Elder writes: "Brakhage shares Maeterlinck's beliefs that the referential or denotational powers of language are incapable of describing the contents of the inner life and that only the rhythm and music of language can convey the make-up of the inner world." Elder, *The Films of Stan Brakhage in the American Tradition of Ezra Pound, Gertrude Stein, and Charles Olson* (Waterloo, ON: Wilfrid Laurier Press, 1998), 78.

¹² Ken Jacobs quoted in Flo Jacobs, Ken Jacobs, Luis Recoder, Lynne Sachs, Mark Street, Malcolm Turvey, and Federico Windhausen, "Roundtable on Digital Experimental Cinema," *October* 137 (Summer 2011): 65.

¹³ Leonard Meyer, *Style and Music: Theory, History, and Ideology* (Philadelphia: University of Pennsylvania Press, 1989), 8. The "hierarchy of constraints" is discussed in the same text, pages 13–23. For an application of the idea of constraints in film analysis, see David Bordwell, "Hou, or Constraints," in *Figures Traced in Light: On Cinematic Staging* (Berkeley, Los Angeles, and London: University of California Press, 2005), 186–237.

¹⁴ The use of italics is meant to emphasize that I reference only Arnheim's technological limitations, not his list of perceptual and metaphysical limitations, which have proven to be more controversial. I also do not necessarily subscribe to Arnheim's overarching argument that uniquely cinematic devices, conceived as limitations of the medium, transform mechanical reproduction into art. Arnheim is invoked solely for his insistence that film as a technology has built-in constraints that inform aesthetics. See Rudolf Arnheim, *Film As Art* (Berkeley and Los Angeles: University of California Press, 1960), 8–134.

¹⁵ The avant-garde's opposition to Hollywood is productively examined and challenged in David E. James, *The Most Typical Avant-Garde: History and Geography of Minor Cinemas in Los Angeles* (Berkeley, Los Angeles, and London: University of California Press, 2005).

¹⁶ There are many distinguished examples of scholarship on the working processes of narrative filmmakers that could be cited here, but three exceptional texts that analyze three distinct national and institutional contexts are David Bordwell, *Ozu and the Poetics of Cinema* (London and Princeton: BFI and Princeton University Press, 1988); Colin Crisp, *The Classic French Cinema 1930–1960* (Bloomington: Indiana University Press, 1993), 266–414; and Lisa Dombrowski, *The Films of Samuel Fuller: If You Die, I'll Kill You!* (Middletown, CT: Wesleyan University Press, 2008).

¹⁷ David Gatten, telephone conversation with the author, June 24, 2015.

¹⁸ See Robert C. Allen and Douglas Gomery, *Film History: Theory and Practice* (New York: McGraw-Hill, Inc., 1985); Barry Salt, *Film Style and Technology: History and Analysis*, 2nd ed. (London: Starword, 1992); David Bordwell, Janet Staiger and Kristin Thompson, *The Classical Hollywood Cinema: Film Style & Mode of Production to 1960* (New York: Columbia University Press, 1985); John Belton, *Widescreen Cinema* (Cambridge, MA and London: Harvard University Press, 1992); James Lastra, *Sound Technology and the American Cinema: Perception, Representation, Modernity* (New York: Columbia University Press, 2000); and Lea Jacobs, *Film Rhythm after Sound: Technology, Music, and Performance* (Berkeley, Los Angeles, and London: University of California Press, 2014).

¹⁹ "Production differentiation" and "standards of quality" are heuristics proposed in Bordwell, Staiger, and Thompson, 243–247.

²⁰ See, for instance, Noël Carroll's claim that Ernie Gehr's *Serene Velocity* (1970) makes a philosophical contribution to film theory in Carroll, "Philosophizing through the Moving Image: The Case of *Serene Velocity*," *The Journal of Aesthetics and Art Criticism* 64.1 (Winter 2006): 173–185.

²¹ See Sheldon Renan, *An Introduction to the American Underground Film* (New York: E.P. Dutton, 1967); David Curtis, *Experimental Cinema* (New York: Universe Books, 1971); P. Adams Sitney, *Visionary Film: The American Avant-Garde 1943–2000*, 3rd ed. (Oxford and New York: Oxford University Press, 2002); and A.L. Rees, *A History of Experimental Film and Video* (London: BFI, 1999).

²² See Malcolm Le Grice, *Abstract Film and Beyond* (London: Studio Vista, 1977); Peter Gidal, ed., *Structural Film Anthology* (London: BFI, 1976); Peter Gidal, *Materialist Film* (New York: Routledge, 1988); William Wees, *Recycled Images: The Art and Politics of Found Footage Films* (New York: Anthology Film Archives, 1993); and James Peterson, *Dreams of Chaos, Visions of Order: Understanding the American Avant-Garde Cinema* (Detroit: Wayne State University Press, 1994).

²³ See Gene Youngblood, *Expanded Cinema* (New York: E.P. Dutton, 1970); Elder, *The Films of Stan Brakhage*; Sitney, *Visionary Film* and *Eyes Upside Down: Visionary Filmmakers and the Heritage of Emerson* (Oxford and New York: Oxford University Press, 2008); Peterson, *Dreams of Chaos*; and Gregory Zinman, "Handmade: The Moving Image in the Artisanal Mode" (PhD diss, New York University, 2012).

²⁴ The definitive article on Messiaen's influence on Brakhage remains Marie Nesthus, "The Influence of Olivier Messiaen on the Visual Art of Stan Brakhage in *Scenes From Under Childhood* Part One," *Film Culture* 63–64 (1977): 39–50. Although Messiaen's influence extends through all four sections of *Scenes*, it should be noted that Brakhage only used his lab's printing machine on Parts 2–4. See Chapter 3 for a more detailed discussion of the making of *Scenes from Under Childhood*.

²⁵ See David E. James, *Allegories of Cinema: American Film in the Sixties* (Princeton, NJ: Princeton University Press, 1989); David E. James, ed., *To Free the Cinema: Jonas Mekas & the New York Underground* (Princeton, NJ: Princeton University Press, 1992); David E. James, *The Most Typical Avant-Garde*, Scott MacDonald, ed.; *Cinema 16: Documents Toward a History of the Film Society* (Philadelphia: Temple University Press, 2002); Scott MacDonald, ed., *Art in Cinema: Documents Toward a History of the Film Society* (Philadelphia: Temple University Press, 2006); Scott MacDonald, ed., *Canyon Cinema: The Life and Times of an Independent Film Distributor* (Berkeley, Los Angeles, and London: University of California Press, 2008); Scott MacDonald, ed., *Binghamton Babylon: Voices from the Cinema Department 1967–1977* (Albany: SUNY Press, 2015); Michael Zryd, "The Academy and the Avant-Garde: A Relationship of Dependence and Resistance," *Cinema Journal* 45.2 (2006): 17–42; Michael Zryd, "Experimental Film and the Development of Film Study in America," in *Inventing Film Studies*, eds. Lee Grieveson and Haidee Wasson (Durham: Duke University Press, 2008), 182–216; Erika Balsom, *Exhibiting Cinema in Contemporary Art* (Amsterdam: Amsterdam University Press, 2013); Steve Anker, Kathy Geritz, and Steve Seid, eds., *Radical Light: Alternative Film and Video in the San Francisco Bay Area, 1945–2000* (Berkeley, Los

Angeles, and London: University of California Press, 2010); and David E. James and Adam Hyman, eds., *Alternative Projections: Experimental Film in Los Angeles, 1945–1980* (New Barnet, Hertfordshire: John Libbey Publishing, 2015).

²⁶ William C. Wees, *Light Moving in Time: Studies in the Visual Aesthetics of Avant-Garde Film* (Berkeley and Los Angeles: California University Press, 1992), 3–4.

²⁷ *Ibid.*, 4.

²⁸ For an account of the influence of the 16mm Bolex camera on the avant-garde, see Carlos Bustamante, “The Bolex Motion Picture Camera,” in John Fullerton and Astrid Söderbergh Widding, eds., *Moving Images: From Edison to the Webcam* (Bloomington: Indiana University Press, 2016), 59–68.

²⁹ Sitney, *Visionary Film*, 49.

³⁰ In some cases, I use the term “post-production” to refer to processes that are performed upon the images after the act of shooting, although I generally try to avoid it, as it makes little sense in relation to the artisanal mode of avant-garde filmmaking.

³¹ Fred Camper, “The End of Avant-Garde Film,” *Millennium Film Journal* 16–17–18 (Fall/Winter 1986–87): 106.

³² *Ibid.*

³³ See Stan Brakhage, *A Moving Picture Giving and Taking Book* (West Newbury, MA: Frontier Press, 1971); Lipton, *Independent Filmmaking*; Bastian Clevé, *The Art of Personal Filmmaking: How to Create Optical Special Effects with Bolex Film Camera and J-K Optical Printer* (Laguna Niguel, CA: Images International, 1989); Helen Hill, ed., *Recipes for Disaster: A Handcrafted Film Cookbooklet*, http://www.filmlabs.org/docs/recipes_for_disaster_hill.pdf; and Bill Brown, *Action!: Professor Know-It-All’s Illustrated Guide to Film and Video Making* (Portland, OR: Microcosm, 2012).

³⁴ See Kathryn Ramey, *Experimental Filmmaking: Break the Machine* (Burlington, MA: Focal Press, 2015).

³⁵ FrameWorks is housed online at <http://www.hi-beam.net/fw.html>.

³⁶ Phil Solomon quoted in MacDonald, “Interview with Phil Solomon,” in *A Critical Cinema* 5, 202.

³⁷ Jonas Mekas, “A Call for a New Generation of Film Makers,” *Film Culture* 19 (1959): 2–3.

³⁸ Jonas Mekas, “Cinema of the New Generation,” *Film Culture* 21 (Summer 1960): 19.

³⁹ “The First Statement of the New American Cinema Group,” *Film Culture* 22–23 (Summer 1961): 133.

⁴⁰ See Manny Farber, “White Elephant Art Versus Termite Art,” *Film Culture* 27 (Winter 1962–63): 9–13.

⁴¹ Maya Deren, “Amateur Versus Professional,” *Film Culture* 39 (Winter 1965): 46.

⁴² Chick Strand quoted in Tony Pipolo and Grahame Weinbren, eds., “A Montage of Voices: Twenty Years of Filmmakers’ Statements,” *Millennium Film Journal* 16–17–18 (Fall/Winter 1986–87): 255.

⁴³ Arthur Knight, “SR Goes to the Movies: New American Cinema?” *Saturday Review*, November 2, 1963: 41. Knight’s contention is somewhat puzzling given that three years earlier, he wrote, “Many of [the experimental filmmakers] have a degree of technical proficiency that fully qualifies them for—and sometimes earns them—lucrative assignments in the commercial studios.” See Knight, “The Far Out Films,” *Playboy* 7.4 (April 1960): 85.

⁴⁴ Ernest Callenbach, “Films of Stan Brakhage,” *Film Quarterly* 14.3 (Spring 1961): 48.

⁴⁵ Eugene Archer, “The Screen: Avant-Garde,” *New York Times*, August 3, 1962: 14.

⁴⁶ Dan Sullivan, “Andy Warhol’s *Chelsea Girls* at the Cinema Rendezvous,” *New York Times*, December 2, 1966: 45.

⁴⁷ Stan Brakhage, “Stan Brakhage Letters,” *Film Culture* 40 (Spring 1966): 76.

⁴⁸ J.J. Murphy, *The Black Hole of the Camera: The Films of Andy Warhol* (Berkeley, Los Angeles, and London: University of California Press, 2012), 255.

⁴⁹ For an explication of these ideas, see Peter Kubelka, “The Theory of Metrical Film,” in P. Adams Sitney, ed., *The Avant-Garde Film: A Reader of Theory and Criticism* (New York: Anthology Film Archives, 1978), 139–159.

⁵⁰ M.M. Serra, telephone conversation with the author, March 20, 2015. Serra was a student in Clarke’s class.

⁵¹ Julie A. Turnock, *Plastic Reality: Special Effects, Technology, and the Emergence of 1970s Blockbuster Aesthetics* (New York: Columbia University Press, 2015), 152.

⁵² Manohla Dargis, “Unseen Guide’s Silent Journeys to Lyric Nature: The Startlingly Beautiful Films of Nathaniel Dorsky,” *New York Times*, April 13, 2012: AR10.

⁵³ See Arnheim, *Film As Art*, and many of the essays in André Bazin, *What Is Cinema?*, trans. Hugh Gray (Berkeley and Los Angeles: University of California Press, 1967).

⁵⁴ Clement Greenberg, "Towards a Newer Laocoön," in John O'Brian, ed., *Clement Greenberg: The Collected Essays and Criticism*, vol. 1 (Chicago: University of Chicago Press, 1986), 32.

⁵⁵ See Le Grice, *Abstract Film and Beyond*; Gidal, ed., *Structural Film Anthology*; and Gidal, *Materialist Film*. The term "Structural Film" was coined by P. Adams Sitney, "Structural Film," *Film Culture* 47 (Summer 1969): 1–9. A revised version of this essay is in *Visionary Film*, 347–70. The theoretical and art-world contexts that informed Structural Film, or "the minimal strain," are analyzed in Peterson, *Dreams of Chaos*, 71–125.

⁵⁶ See the four essays that comprise Noël Carroll, "Part I: Questioning Media," in *Theorizing the Moving Image* (Cambridge and New York: Cambridge University Press, 1996), 3–74; and Noël Carroll, "Forget the Medium!" in *Engaging the Moving Image* (New Haven and London: Yale University Press, 2003), 1–9.

⁵⁷ D.N. Rodowick, *The Virtual Life of Film* (Cambridge and London: Harvard University Press, 2007), 34.

⁵⁸ Jonathan Walley, "The Material of Film and the Idea of Cinema: Contrasting Practices in Sixties and Seventies Avant-Garde Film," *October* 103 (Winter 2003): 26. See also Jonathan Walley, "Paracinema: Challenging Medium-specificity and Re-Defining Cinema in Avant-Garde Film" (PhD diss, University of Wisconsin-Madison, 2005), 1–34.

⁵⁹ Zinman, "Handmade," 44.

⁶⁰ Rodowick, 41.

⁶¹ Ibid.

⁶² John G. Hanhardt, "The Medium Viewed: The American Avant-Garde Film," in Marilyn Singer, ed., *A History of the American Avant-Garde Cinema* (New York: The American Federation of Arts, 1976), 22.

⁶³ PixelVision refers to the Fisher-Price PXL-2000, a toy black-and-white camcorder released in 1987. The ghostly images that the camera was capable of producing found favor with some experimental filmmakers, including Sadie Benning, Joe Gibbons, and Elisabeth Subrin.

⁶⁴ That said, there are relatively brief discussions of two Austrian filmmakers, Peter Kubelka and Martin Arnold, whose work was especially influential in the United States.

Chapter One
Her Fragrant Emulsion: 16mm Film

For most of its history, avant-garde cinema has been closely identified with one technological parameter above all others: its gauge. Although 16mm film stock had existed since 1923, governmental and industrial uses during World War II brought the stock to increased prominence. Consequently, the affluent post-war period witnessed a boom in professional production equipment for educational, industrial, and other non-theatrical uses of 16mm.¹ As a growing coalition of avant-garde filmmakers took advantage of these technological developments, what began as a financial imperative became a marker of aesthetic and political integrity. For many filmmakers, 16mm connoted not only the ingenuity and purity of the amateur, but also implicitly valorized a comprehensive artistic protocol that encompassed aspects of filmmaking such as the sensuous quality of the image, the physical dimension of the medium, and specific processes, including cement splicing, making non-synchronous soundtracks, and printing from multiple rolls of original. While some filmmakers later embraced 8mm, Super-8, and video, the avant-garde continued to be strongly associated with 16mm, an identity that would later become the subject of one of its undisputed classics, Morgan Fisher's *Standard Gauge* (1984).²

However, for some filmmakers, many of whom began their artistic careers in other media, the highly fixed nature of 16mm film presented a distinct set of challenges. Echoing the concerns of classical and contemporary film theorists, cameras came equipped with built-in lens systems that simply recorded events, documenting a "reality" that was, in fact, rigidly circumscribed.³ The filmstrip itself was inherently modular by design, which enforced a linearity that could be viewed as a hindrance. For instance, Carolee Schneemann explained: "I saw film as thousands of

frames of paintings passing and was very concerned with breaking frame. I had spent years as a painter trying to get out of the fixity of the rectangle... With film, because of the fixity of projection systems, there are only certain linear directions in which images can move. Things like that really used to bewilder me.”⁴ For filmmakers accustomed to painting, sculpture, or even music, film became frustratingly inaccessible once it was loaded into the camera, incapable of being physically integrated into the artistic process or brought into dynamic interaction with the filmmaker. Furthermore, differences in film stocks were akin to differences in types of paint. In addition to sensitivity to light and amount of grain, each color stock had a unique palette that other stocks could not duplicate or reproduce. Whether Eastman Kodak, Fuji, or Agfa-Gevaert, multinational corporations set technological limitations upon the ways in which artists could express themselves.

These artistic problems raise a number of questions about the role of 16mm film in shaping avant-garde filmmaking aesthetics: How did filmmakers overcome the inherent constraints of 16mm by reconfiguring them as formal possibilities? How did filmmakers outside of the direct filmmaking and Structural/Materialist filmmaking paradigms incorporate the 16mm filmstrip into their practice? What are the determining effects of film stock, and how did filmmakers harness these effects to develop original and distinctive personal aesthetics? How did the fact that film is subject to decay inform a politicized strand of feminist avant-garde filmmaking? In what sense do avant-garde filmmakers view the filmstrip as a metaphor, a nexus of image, light, material, and process, and which formal techniques bring this idea to the fore? What are some of the ways in which the particular qualities of 16mm were adapted for the personal filmmaking tradition, figured as autobiographical or evident of a worldview? And, finally, how did filmmakers reconceive the material and technological basis of their medium as an opportunity

for perceptual transformation?

Unlike the other technologies discussed in this dissertation, the 16mm filmstrip, especially conceived as an object, has been the subject of much critical and scholarly attention. Broadly speaking, scholars have tended to contextualize 16mm in terms of two pervasive avant-garde paradigms: direct filmmaking and Structural/Materialist film. For instance, Gregory Zinman's forthcoming *Handmade: The Moving Image in the Artisanal Mode* is a comprehensive survey of handmade abstract moving image art, which Zinman finds to be principally intermedial in nature. Consequently, his book deftly traces cinema's interaction and engagement with other media and art forms, allowing Zinman to broaden the direct filmmaking tradition (which he re-names "handmade cinema") to include electronic media, kinetic art, the color organ, psychedelic light shows, and other paracinematic phenomena. Ultimately, Zinman's contribution is epistemological, demonstrating the ways in which handmade cinema challenges the parameters of cinema studies and encourages film scholars to rethink the history of the moving image.⁵

For the most part, the filmmakers discussed in this chapter are not typically associated with handmade cinema, nor are their films primarily abstract in nature. The approaches to the filmstrip taken by Peter Hutton, Nathaniel Dorsky, David Gatten, Jennifer Reeves, Peggy Ahwesh, Naomi Uman, Phil Solomon, and Luther Price have handmade dimensions with some degree of overlap with Zinman's category, but most are rooted in the photographic possibilities of 16mm filmmaking. For these filmmakers, certain qualities of 16mm—variabilities in stocks, its existence as a material object, its tendency to decay, and its metaphorical richness—enrich their working processes and inform the aesthetic, conceptual, and autobiographical dimensions of their films. Therefore, my emphasis on the filmstrip is not exactly synonymous with direct filmmaking, handmade cinema, or the abstract tradition.

The most common approach to 16mm in avant-garde film scholarship, however, has been as a central component of Structural/Materialist film, or, more broadly, the avant-garde's "reflexive turn." An essential characteristic of Structural Film, P. Adams Sitney's contested label for a series of reflexive films from the late 1960s and 1970s that foreground the mechanical and intellectual propositions that result in their own becoming, was the interrogation of the medium through structures designed to engage prominent aspects of the cinematic experience.⁶ Many of the films associated with this trend reflexively "pictured the filmstrip," directly showing the filmstrip onscreen or making it a strongly pronounced conceptual element of the film. Critics recontextualized important precursors to Structural Film such as *Mothlight* (Stan Brakhage, 1963), *Arnulf Rainer* (Peter Kubelka, 1960), *Film in Which There Appear Edge Lettering, Sprocket Holes, Dirt Particles, Etc.* (George Landow, 1965–66), *Tom, Tom, the Piper's Son* (Ken Jacobs, 1969), and *Color Film* (Standish Lawder, 1972) to argue that these films functioned to make viewers aware of the medium's material reality.⁷ Some critics went even further than Sitney in their prescriptive insistence upon the political import of the reflexive position. For instance, Peter Gidal writes: "Structural/Materialist film attempts to be non-illusionist. The process of the film's making deals with devices that result in demystification or attempted demystification of the film process... Consequently a continual attempt to destroy the illusion is necessary."⁸

This chapter will go beyond reflexivity by turning its attention to the post-Structural generation of avant-garde filmmakers for whom demystification was only one of many approaches to 16mm. In addition to creating visual experiences that exceed the bounds of conventional modes of representation, some filmmakers incorporated the filmstrip into their practice to increase physical intimacy with their materials and thereby personalize what they

perceive to be a depersonalized medium. Other filmmakers seized upon the potential for the sensuous qualities of particular film stocks to contribute to a painterly image. Still others conceived of the filmstrip metaphorically, as an emulsified repository of images and sounds that provide a physical record of existence. For these filmmakers, 16mm is an audiovisual archive of cultural memory, which can be directly manipulated for personal or political ends. Interestingly, the “minor cinema” generation that followed Structural/Materialist film did not abandon materiality or treat 16mm as transparent, but instead developed techniques to re-envision the filmstrip as a formal or compositional element, living entity, commercial product, inscription of dominant culture, extension of the artist’s body, or catalogue of personal obsessions.⁹

Above all, this chapter will argue that the technological constraints imposed by camera and film manufacturers—rigid perspectival systems, standardized chemical formulas for representing light, shadow, and color, linearity, inaccessibility, and the capacity for decay—provided fertile aesthetic ground for avant-garde filmmakers, who innovated approaches to these problems that provided extraordinary possibilities for visual transformation and personal expression. First, I will explore the ways in which Peter Hutton and Nathaniel Dorsky made the qualities of particular film stocks integral components of a painterly image. The next section profiles a variety of avant-garde filmmakers, including Peggy Ahwesh and Naomi Uman, who channeled emulsion decay for progressive political projects. Finally, case studies of the work of Phil Solomon and Luther Price will provide examples of filmmakers who reinvented the film’s emulsion and objecthood, respectively, for the personal filmmaking tradition.

Film Stock: Peter Hutton, Nathaniel Dorsky, and the Painterly Image

Although their films are quite different, Peter Hutton and Nathaniel Dorsky are often cited as the foremost contemporary practitioners of the poetic tradition in avant-garde cinema.

Their films are particularly renowned for their sensuality, refinement, and painterly allure.

Hutton aptly describes his approach to cinema as “just taking the time to let something naturally evolve and astound you with how beautiful it is.”¹⁰ Similarly, Scott MacDonald observes that “making beautiful images comes easily to Hutton,” an evaluation that could be applied to Dorsky, as well.¹¹ Although Hutton is revered for his black-and-white films shot on Tri-X and Dorsky is closely associated with color films made in Kodachrome, both filmmakers have made film stocks central to their aesthetic projects. In this section, I will examine the ways in which both filmmakers have drawn upon the unique palettes of available film stocks to produce painterly images of tactile delicacy, pursuing highly original approaches to the medium while repurposing the constraints of the technology for the poetic tradition. Moreover, this section will also detail these filmmakers’ artistic responses to the discontinuation of the film stocks that contributed substantially to their painterly aesthetics.

First, however, it will be helpful to clarify the specific qualities that are being invoked when cinematic images are described as “painterly.” Hutton has made films that are deliberate homages to the Hudson River School of landscape painting, and Dorsky has acknowledged his admiration for the Italian Early Renaissance, but typically, the reference is to some form of Impressionism, evoking painters such as Turner, Renoir, or Degas. That said, the use of the term “painterly” is less an acknowledgement of a particular style of painting than a desire for a sensuous image that transfigures the natural world while retaining some denotative connection to reality. In cinema, painterly images often possess a haptic, tactile quality, evident in a visible texture that involves a certain lack of resolution, softening of line and contour, and surfaces that evoke impasto or emphasize grain.¹² Usually, painterly filmmakers are sensitive to nuances in shifts of light, especially in relation to “ordinary” subject matter, such as domesticity, urban or

rural life, and the rhythms of lived experience. Images tend to be composed, activating the entire frame and defamiliarizing objects to initiate subtle changes in the viewer's perception. Camera movement is sometimes gestural, closely linked to an embodied consciousness, the body's rhythms, or the point-of-view of the filmmaker. While painterly images are not exclusive to a single mode or subgenre of avant-garde cinema, they are closely associated with the poetic tradition.¹³

Of course, film stock is not inherently connected to a painterly aesthetic, but its partial determination of color, granularity, and contrast makes it a significant contributor. Although all film stocks share certain basic characteristics, they are not created entirely equal. Of course, a filmmaker could choose to shoot in black-and-white or color, but also on negative (resulting in images in which light and color values appear in inverse relationship to the scene photographed) or reversal (resulting in positive images, which reproduce the light and color values of the scene photographed). Other variable characteristics include film speed (ASA), which indicates the stock's responsiveness to light. Stocks are color-balanced for daylight or tungsten, which affects sensitivity to color temperature. Stocks have different granularities as a result of their ASAs and developing procedures. There are different dynamic ranges, which determine latitude of over or underexposure. Certain stocks are higher contrast than others, which means that small changes in exposure result in dramatic increases or decreases of density. Depending in part upon exposure, color stocks will differ in terms of level of saturation.¹⁴

As would be expected, there were far more options for filmmakers like Hutton and Dorsky in the 1960s and 1970s than there are in the 2010s. Due to their ubiquity, convenience, and affordability, nearly all avant-garde filmmakers shot reversal stocks until the 1980s. The major black-and-white reversal stocks were made by Eastman Kodak (Plus-X, Tri-X, or 4-X),

while the color reversal stocks included Kodachrome and Ektachrome (both Eastman Kodak), Fujichrome, plus many other stocks made by smaller or international companies, such as Anscochrome or Agfa-Gevaert. These stocks were not exactly interchangeable. For instance, Agfa-Gevaert and Kodachrome were warmer in tone than Fujichrome, which had a bluish cast. In *Independent Filmmaking*, Lenny Lipton's popular guide for the 16mm filmmaker published in 1972, the author devotes ten pages to a detailed critique of reversal stocks.¹⁵

For his first three decades of filmmaking, Peter Hutton was associated with his use of Tri-X, Eastman's Kodak 16mm black-and-white reversal stock, which had a daylight ASA of 200.¹⁶ Hutton experimented occasionally with Plus-X, but he was drawn to the edgier quality of Tri-X, which was less refined and had a more pronounced grain structure, which Hutton found to be more expressive.¹⁷ By the time Hutton made his last film in Tri-X, *Study of a River* (1996–97), he had mastered its capabilities, especially its capacity for high contrast images that dramatically juxtapose light and dark, exhibiting a stark purity in their blacks and whites. The opening shot, for instance, is a striking landscape composition that divides the frame into three horizontal bands of light and dark. In the bottom third, the Hudson River is rendered as an inky black void that culminates in a humpbacked coastline, while the top third is populated with motionless halos of smoky black clouds. The middle of the frame, however, is dominated by the sun, perfectly centered in the frame and cutting a soft ray of light across the blackness of the water. In a series of shots later in the film, particles of light swirl over the Hudson's surface, but this familiar image is given breathtaking vibrancy by Hutton's high-contrast cinematography and the combination of the light with the emulsion grain. The water is so black that the light takes the appearance of an electrical storm, sparks shimmering intensely over a softly undulating chasm coated in a patina of swirling grain.

In his earliest days at the San Francisco Art Institute, Hutton was drawn to Tri-X's graphic qualities and proclivity for enhancing photographic reality. As a student, Hutton was staging elaborate works of performance art, which he began to photograph for documentation purposes. Impressed with the sensual beauty of the footage, Hutton switched to filmmaking.¹⁸ From the beginning, he gravitated to black-and-white as a response to the kinetic, colorful West Coast avant-garde of his teachers and fellow students. He recalls: "All my contemporaries were shooting color because it was the 1960s, and everybody was doing the psychedelic thing. I wanted to get to a more primary language. I thought, 'I'll shoot black-and-white for ten years and get to know it,' but I fell in love and kept going."¹⁹ For Hutton, shooting Tri-X was part of a more general goal of pursuing a contemplative cinema rooted in meditation. Because the West Coast had a reputation for a Kodachrome-based, richly saturated look, Hutton used black-and-white to carve out his formal language in opposition to his peers: "My cinema was going in a different direction, trying to slow down, get people to look at still images."²⁰

From his background in the studio arts, Hutton was expressly interested in deepening his relation to his materials, particularly the act of shooting 16mm film. This translated to a process in which Hutton tried to shoot as much film as possible to become familiar with every aspect of his Bolex camera, Tri-X, and its exposure latitude. Hutton recalled, "Always at the core of my filmmaking was an idea that came from being a painter and a sculptor, where every day you go to the studio and pace around and come up with something."²¹ For Hutton, this impulse was fundamental and primary, stemming from a desire to establish an intimate relationship to the medium:

I wanted to take the camera out and shoot every day to develop a relationship to film and looking. You shoot the same camera, same material, and develop a more spontaneous and fluid relationship to the process. Once you come to know it, everything is spot-on. The relationship with film becomes non-arduous. I didn't

need to set a reading on a light meter, I could just intuit the exposure after shooting with that stock for so many years.²²

Another aspect of this eagerness for physical intimacy with the process was Hutton's dictum to keep it simple. Consequently, Hutton gravitated to Tri-X because black-and-white reversal seemed like the most affordable and flexible training tool. Color stock was more financially demanding, which threatened to impede Hutton's ability to shoot each day. Moreover, Hutton wanted to avoid becoming overly concerned with the technical aspects of filmmaking apart from the camera, the stock, and the exposure. "There's this tendency in film to make it perfect, seamless, and spotless," Hutton explained. "My feeling was to keep it raw and not worry too much about the technical stuff. Even though you fall into trying to get it right when you get to the lab, making it so precious goes against some of my core ideas of cinema."²³

Hutton's desire to go back to basics by keeping it simple was guided by the idea that although Tri-X seemed almost primitive, a thorough knowledge of its particulars would allow him to burrow into its subtleties and complexities, tapping into a rich visual idiom. That is, perhaps the basics are "the basics" precisely because they access something fundamental about the medium. Hutton likens this idea to other art forms: "When you take an art class and you start drawing with charcoal, you think, 'This is so limiting!' Then you realize that you *can* learn to draw really well in charcoal, though it requires a lot of discipline—and that the results can look interesting and distinctive. I always saw working with black and white as learning to use a difficult, but fundamental visual vocabulary."²⁴ For Hutton, black-and-white reversal is the charcoal of cinema. It initially seems restrictive because beginning filmmakers are inundated with visual ideas from other films and media that seem more complex. With experience, one realizes that Tri-X's constraints actually contain the potential for a sophisticated approach to cinema: the ability to sculpt with the image, explore film's painterly dimensions, establish a

physical relationship with a photographic medium, and grow accustomed to the shooting process, which involves contemplation, timing, and discipline.

Hutton was also drawn to the idea of working closely with a single film stock so that he could master the art of shooting, which has always been his primary interest as a filmmaker. “It’s important to get out with a camera and interact with the world,” Hutton explains. “The act of collecting is for me the most satisfying part of filmmaking.”²⁵ Consequently, Hutton’s aesthetic has always privileged the interaction between light, camera, stock, and filmmaker, with editing and lab work relegated to the background.²⁶ Since Hutton is almost always shooting landscapes, his process involves long hours of immersion in his environment as he figures out the spatial possibilities of his surroundings and waits for the light to shift to an advantageous position. In an attempt to increase his familiarity with the capabilities of Tri-X, Hutton consistently bracketed a portion of his shooting day to experiment with exposure. “As a filmmaker, I was always pushing it. Maybe the shot is an f5.6, but what would the stock do if I shot at f16? I didn’t use a light meter, I could just hit it, and it would come out. But, still, I would push—maybe it’s too dark, but I’ll try it anyway and hope that something good happens.”²⁷ In Hutton’s method, the film stock, working process, and poeticism of the imagery are related. Their synthesis involves a contemplative, almost Zenlike commitment to drawing upon the filmmaker’s knowledge of the medium to capture the light at just the right moment. Not coincidentally, this meditative shooting practice is very similar to the viewer’s experience of Hutton’s films, which are filled with reflective, nearly static images.

Hutton’s use of Tri-X to achieve a painterly aesthetic is clearly evident in his series of *New York Portraits*, arguably his most canonical films. *New York Portrait: Chapter One* (1978–79), *New York Portrait: Chapter Two* (1980–81), and *New York Portrait: Chapter Three* (1990)

are modest, lyrical symphonies that defamiliarize the city, transfiguring the natural world to evoke a sense of timelessness. Although they share some characteristics with classic city symphonies such as *Manhatta* (Sheeler/Strand, 1921) and *In the Street* (Levitt/Loeb/Agee, 1948), Hutton's films are non-typical in that they depict a city largely empty of people, privileging moments of quiet repose over the flurry of modern life common to the mode in the 1920s. There is very little camera movement. Instead, each shot is rigorously composed, often from unusual or oblique angles, as in shots of men and women wading through floodwaters in the street captured from directly overhead. Hutton seems to find dramatic landscapes within the city, often returning to extremely high contrast images of black skyscrapers forming geometric patterns against the gray sky. Recalling Hutton's earlier analogy, the films are redolent of charcoal, registering nuances in shifts of light and locating slower rhythms within the urban environment. The third shot of *Chapter One*, for instance, is a highly composed image of an upper-level window that looks down onto the street. The shot is reminiscent of a charcoal sketch, full of heavy black shadow and an indistinct, hazy gray window coating.

In these films, Hutton precisely exposes the Tri-X to explore the stock's capacity for extremely high contrast images, enhancing the viewer's perception by making the familiar seem strange. As is typical of a painterly aesthetic, Hutton transforms his immediate surroundings while retaining some connection to the denotative. The result is a palpable elegance, brimming with texture and shade. In *Chapter Two*, Hutton presents an underexposed shot of nine kids as they interact on a sidewalk from high overhead, which turns into a study of the nuances between Zones I, II, and III on the gray scale.²⁸ Due to the gridlike composition, the street corner becomes an island that encompasses a lighter square bearing the words "Dave" and "Mother" written in sidewalk chalk. As the kids mill about, they cast extremely long shadows, implying a noontime

sun directly overhead, but the exposure is so dark that it registers as an evocative documentary chiaroscuro. In an astonishing sequence from *Chapter Three*, Hutton exposes the Tri-X for playful concealment (and revealment) during a nighttime fireworks display. Several shots depict the fireworks as abstract white streaks in the far distance, shrouded in an inky black. When the biggest fireworks explode during the finale, a swath of middle gray light cutting across the frame reveals that Hutton is filming from a harbor across the river, with large masts of ships in the foreground. Wispy gray smoke hangs in the air, as the ships gradually slip back into the darkness of night. For the viewer, this spatial revelation comes as something of a shock, destabilizing our sense of scale and location, but it also invites comparisons to Thomas Birch's paintings of the Philadelphia and New York harbors.

In addition to high contrast, Hutton thoroughly exploits Tri-X's granularity (a partial result of its faster ASA), emphasizing the grain to such a degree that it becomes a constitutive component of the images. In mainstream film production, the granularity of the stock was generally considered to be an unwanted artifact, a problem that the chemists at Eastman Kodak were continually trying to "fix."²⁹ Through his exposures, Hutton tends to amplify its effects, especially in the many shots of buildings silhouetted against the sky, the most reflective part of the image. Hutton frequently exposes these shots with such high contrast that they become abstract. For instance, in a shot of the Goodyear Blimp flying between two vertical skyscrapers at the edges of the frame in *Chapter Two*, the buildings' teeth-like design makes it seem as though the blimp is caught between two sides of a giant zipper, almost like a Saul Bass design. Because the gray sky represents the lightest portion of the frame, it practically sparkles with grain, creating a shimmering surface that activates what would typically be the most inactive part of the composition. The grain also figures into one of the more well-known shots in *Chapter*

One, a two-and-a-half-minute long take of pigeons flying over SoHo. Hutton patiently trains his camera on the sky, again a dark gray (close to Zone II), observing as two distinct kits of pigeons arc into and out of the frame, unexpectedly appearing and disappearing in different quadrants. In this instance, the granularity is so strong that it unifies clouds, pigeons, and sky within the visual field. Due to the shot scale, the pigeons are about the size of the grains themselves, so their movement becomes the element that cues the viewer, not their separation from a neutral background. In these instances, Hutton uses Tri-X's inherent grain structure to imbue his shots with tactility reminiscent of impasto, almost like the cinematic equivalent of brush strokes.

An additional constraint for professional and amateur filmmakers was print stock, the stock used primarily by labs to make projection prints. Depending upon the print stock used, contrast and color values could shift dramatically. Hutton always printed to Eastman 7361, a reversal black-and-white print stock that was discontinued in the 1990s, which had a tremendous effect on Hutton's filmmaking. "I had used black-and-white reversal for all my early films because it had a particular quality that I couldn't get with black-and-white negative," Hutton explained.³⁰ "When Kodak eliminated this very important component in my work, I had to let go of reversal because the labs didn't have the print stock anymore. It became a real struggle, and I had to conform to it. In a perfect world, I'd still be shooting and printing reversal."³¹ With the knowledge that he was going to be forced to transition to negative stock, Hutton decided that he would also diversify his filmmaking by shooting in color.

In many respects, Hutton's experience was a belated response to a more general trend, the widespread shift from reversal to negative stocks that had been occurring within 16mm film production since the 1980s. As will be discussed in Chapter Two, reversal dominated the 16mm business in the 1960s and 1970s due to its appeal for television news teams, who benefited from

stocks that could be shot, processed, edited, broadcast, and discarded within the span of a single day. When this market transitioned to analogue video, the reversal business dried up, putting many labs out of business and precipitating the discontinuation of many reversal stocks. This was an acute problem for avant-garde filmmakers, who often edited their own films. Negative stock was less intuitive to edit (due to its inverse light and color values) and far more susceptible to damage.³² For instance, Henry Hills, Hutton's contemporary, first shot negative in 1986 and found that it made editing highly arduous. After struggling through the process of cutting his densely edited *Bali Mécanique* (1992), Hills hired a negative cutter for his next film, which he claimed to be well worth the additional cost.³³

For Hutton, who has always favored shooting over editing, the problem with color negative stock was its resistance to an abstracted reality. As has been discussed, the painterly qualities of Hutton's cinema are rooted in texture, granularity, delicate shifts of light, and a relative lack of resolution, which Hutton found endemic to black-and-white. He describes color stock as "a palette that's more familiar with reality," noting that "with color, there are *so* many possibilities, and it's difficult to make color really distinct. You have to explore and you have to work with it."³⁴ In response, Hutton has experimented with different approaches to color that make his films in negative somewhat more diverse than those in black-and-white reversal. *Time and Tide* (2000), shot on the Hudson River, has a fairly muted palette of icy whites and industrial greens with a few eye-popping orange sunsets for punctuation. The Icelandic landscapes of *Skagafjörður* (2004) lend themselves to a similarly restrained use of color, but the opening section of *At Sea* (2007) is blazingly colorful, with bright blue skies, sparking blue water, and a bolder use of reds and oranges on the shipyard.

In black-and-white, Hutton incorporated the particular qualities of Tri-X into his aesthetic, using its charcoal palette to sculpt the image, emphasize painterly texture, and increase physical intimacy with the medium. Therefore, his shift to color negative has been impressive, but arguably less constitutive of his approach to cinema than his former use of black-and-white reversal. By contrast, color has always been a defining characteristic of the cinema of Nathaniel Dorsky, a filmmaker who has been extraordinarily attentive to the sensitivities of film stock. Reflecting upon his fondness for the array of color reversal stocks on the market in the 1960s and 1970s, Dorsky recalled, “Each stock had a different quality to it, a different humanity.”³⁵ In interviews, Dorsky commonly humanizes his film stocks, sensing in them a tenderness and vulnerability akin to human frailties. Speaking of Kodachrome, Dorsky observed that the stock was “just in my body. I don’t have to use a light meter. I’m just there with it.”³⁶ Anticipating the discontinuation of Kodachrome in 2009, Dorsky analogized his impending shift to color negative to changing from oil to tempera paint, which would be “like a new lover.”³⁷ Dorsky has made at least two films, *Pneuma* (1983) and *Alaya* (1987), that are principally about the emulsion grains of particular reversal stocks, and some of his program notes posit the stock as a collaborator in the film’s realization. His note for *Compline* (2009), for instance, reads: “This film is also the last film I will be able to shoot in Kodachrome, a film stock I have shot since I was 10 years old. It is a loving duet with and a fond farewell to this noble emulsion.”³⁸ Surprisingly, critics and scholars have responded to this facet of Dorsky’s work; his transition from reversal to negative has become an official part of his artist’s biography, discussed by both the *New York Times* and P. Adams Sitney alike.³⁹

The importance of film stock in Dorsky’s development of a painterly aesthetic must be contextualized in relation to Dorsky’s overarching aesthetic project, which he discusses in detail

in *Devotional Cinema* (2003), a short monograph that outlines the filmmaker's original and sensitive approach to cinema. Dorsky defines "devotion" as "the opening or the interruption that allows us to experience what is hidden, and to accept with our hearts our given situation. When film does this, when it subverts our absorption in the temporal and reveals the depths of our own reality, it opens us to a fuller sense of ourselves and our world."⁴⁰ To this end, Dorsky's films consist of complex polyvalent arrangements of visually ravishing images of the natural and manmade world that are difficult to reduce to a concept, theme, or idea. As the shots accumulate, the viewer becomes more mindful, transcending the cognitive operations of thinking-about-thinking and experiencing an embodied engagement with the images.⁴¹ For Dorsky, when a film achieves a level of present-ness and mindfulness about its own status as a visual experience, it realigns the viewer's metabolism and promotes healthful engagement with the world:

In great contemplative montage ... when you cut from one image to another, [you] are actually shifting the solidity of the frame, the weight of the frame, the spatial nature of the frame. Those kinds of shifts, light to dark, heavy to light, or soft or hard, those things actually affect you on a very direct level. If you're out in the daytime in the sun and suddenly the sun goes behind a cloud, you can feel your whole being changed at that moment. It's a whole change, in music it's a key change, all different atmospheres...⁴²

Since 1996, Dorsky has developed a consistent and distinctive set of formal techniques meant to guide his films into the devotional realm. All of Dorsky's 23 "late films" (from *Triste* (1996) to *Prelude* (2015)) feature images of the natural world, often shot within a twenty-minute radius of his San Francisco home, that transform flowers, puddles, clouds, animals, shop windows, textiles, reflections, gestures, and household objects into painterly evocations of shadow, light, and movement. Surprisingly, Dorsky eschews landscape and Renaissance perspective, conjuring a "floating world" of precisely framed tableaux that sometimes evidence an orchestration of events in the frame, from passing reflections in window displays to light

spilling over flower petals. Much discussion of Dorsky's work is concerned with his use of "open form," or polyvalent montage, in which, as Noël Carroll describes, each shot "can be combined with surrounding shots along potentially many dimensions"; that is, Dorsky's shots are arranged according to complex interactions of color, shape, texture, and screen direction that are perceptible but often elusive.⁴³ Finally, Dorsky insists that his films be projected at 18fps, which imbues the images with a physical presence, lending weight and solidity to the frame.

Another essential component of Dorsky's aesthetic is his choice of film stock. His first nine "devotional films"—*Variations* (1992–98), *Arbor Vitae* (1999–2000), *Love's Refrain* (2000–01), *The Visitation* (2002), *Threnody* (2004), *Song and Solitude* (2005–06), *Winter* (2007), *Sarabande* (2008) and *Compline*—were shot on Kodachrome 25, a color reversal, daylight-balanced film. Of course, Kodachrome is perhaps the most famous amateur film stock in history, and its availability for still photography, slides, and motion pictures has ensured its association with some of the most iconic images of the twentieth century, such as Abraham Zapruder's film of the Kennedy assassination, shot on 8mm Kodachrome II. Eastman Kodak introduced 16mm Kodachrome film in 1935, and amateur filmmakers immediately hailed it as a milestone.⁴⁴ Charles Tepperman notes that the public quickly came to connect Kodachrome's vivid color and fine grain structure with "travel and exploration." Associated chiefly with home movies, Kodachrome became the emblem of Eisenhower-era family vacations, bolstered by a thriving postwar economy and the newly established national park and interstate highway systems.⁴⁵

Dorsky's choice of Kodachrome as an essential component of his devotional aesthetic is both understandable and atypical. On the one hand, many color reversal alternatives to Kodachrome, such as Anscochrome and Dynachrome, had been discontinued by the 1990s.

Additionally, Kodachrome was considered “the gold standard,” a high quality stock that was extraordinarily resistant to fading.⁴⁶ Although it was not conducive to professional feature filmmaking, some canonical avant-garde films had been made in Kodachrome, including Kenneth Anger’s *Inauguration of the Pleasure Dome* (1954), Stan Brakhage’s *The Wonder Ring* (1955) and *Nightcats* (1956), Mike Kuchar’s *Sins of the Fleshapoids* (1965), and Bruce Baillie’s *Valentin de las sierras* (1968) and *Quick Billy* (1971). In fact, Brakhage noted that Kodachrome was often associated with the West Coast avant-garde: “West Coast filmmaking is very colorful, very Kodachrome, which was regarded often as vulgarly garish by the East Coast, who are more subject to the pinched tones of a cold climate.”⁴⁷ On the other hand, it was precisely this nostalgic, “colorful look” that made it an unusual choice for exclusive use as an integral element of a filmmaker’s aesthetic program.

Kodachrome was notoriously difficult to process, which will be discussed in greater detail in Chapter Two. Unlike other color stocks, Kodachrome did not contain dye couplers embedded in the film stock. Essentially, Kodachrome consisted of three layers of black-and-white emulsion developed in a series of dye baths to which color was added in a process called K-14. The resulting image was exceptionally unique, characterized by fine grain, high contrast, and overwhelmingly saturated colors, especially favoring reds and other warm tones. By contrast, Ektachrome, developed in the 1940s as an easier-to-process alternative to Kodachrome, was a faster stock with more grain and a more subdued color palette. A *New York Times* profile observed that Kodachrome was something of an acquired taste: “Many photographers swear by the colors [of Kodachrome], while others prefer Ektachrome’s less dramatic rendition. Those who like their reds redder than red use nothing but Kodachrome.”⁴⁸ Similarly, archivist and filmmaker Andrew Lampert affirms, “Kodachrome is larger than life. Its colors are brighter than

your imagination's.”⁴⁹ Famously, Kodachrome's reputation for saturated colors was popularized by Paul Simon in the lyrics to his 1973 ode to the stock: “Kodachrome / They give us those nice bright colors / They give us the greens of summers / Makes you think all the world's a sunny day.”⁵⁰

Dorsky had always been enamored with Kodachrome's unusual palette. “When you have Kodachrome in your camera, you feel like a jeweler working with gold,” Dorsky explains. “You're working with this very hot and precious transmutable substance.”⁵¹ To complicate matters, Dorsky had been experimenting with a range of out-of-date stocks in the films preceding *Triste*. After suffering a severe concussion in an automobile accident, which left him in poor health, he felt an urge to return to the aspects of filmmaking that had fascinated him as a child. Dorsky recalled: “I think part of [going back to Kodachrome] was giving myself a treat. I had been eating brown rice, working with all these stocks that were out of date and processed incorrectly. After the accident, I didn't want to be avant-garde, depressive, alienated, marginal, other. Suddenly, I just wanted to go back to the beginning when I was a kid. ‘Why am I doing this? Oh, I remember, I used to love things in the world and just wanted to take pictures of them.’”⁵²

Furthermore, Dorsky found that he could heighten the deep, wet-paint color saturation of the stock by slightly underexposing his shots. Because Kodachrome had a wide dynamic range, it would retain its color even when the filmmaker stopped down, which produced stunning combinations of light and dark. For Dorsky, the poetic tenderness of the stock was released when he was exploring the bottom of its range: “From the middle on down is where I felt the soul was in Kodachrome. I'm fascinated with this lower end of Kodachrome, the spirit of it.”⁵³ In other words, Dorsky felt that the stock was most expressive when he closed his aperture slightly more

than recommended by the manufacturer for “proper” exposure. Because the stock was slower (25 ASA), it was especially conducive to outdoor shooting, which suited both Dorsky’s process (filming while on long walks around his neighborhood) and climate (San Francisco’s subtle atmospheric changes from season to season).

All of these characteristics are evident in *Sarabande*, one of Dorsky’s most sumptuous films. In contrast to Dorsky’s first explorations of the open form, *Sarabande* is more elliptical. With a few slight exceptions, the human form is mostly excluded. Instead, the film has a more pronounced emphasis on flowers, plants, and vegetables, many of which are obstructed or fragmented by other objects in the frame. Above all, Dorsky dwells exclusively in the bottom end of the Kodachrome, presenting images of brilliant color that are nearly eclipsed by the inky black shadows that dominate the foregrounds. For instance, in the opening shot, the camera peers up through a grate at the sky, but the bluish white of the sun is blocked by darkened forms that only allow glimpses; meanwhile, the forms move left or the camera moves right, but it becomes impossible to determine. In a series of shots that recur with variation, plants or flowers are filmed such that their vibrant greens, yellows, and reds poke through heavy black veils of shadow. Often, Dorsky combines the strengths of the Kodachrome (warm tones and a high dynamic range), underexposing fiery red leaves so that they burn impossibly bright through the darkness. Many of Dorsky’s trademark shots of reflections in shop windows are also underexposed so that the images become less referential and more about a sense of horizontal movement across the frame. Late in the film, sunlight gleams off the edge of the top of a moving car, but the shot is dark enough that only the car’s movement makes it identifiable. In a swelling coda, Dorsky’s camera tilts down through poker-shaped orange flowers, a bursting of color that seems almost otherworldly in relation to the dense play of shadow and color that has preceded it.

Ultimately, the stock's function in Dorsky's Kodachrome films is to push the images from the realm of "observational documentary" into the "floating world." In Dorsky's cinema, the phenomenal world, both natural and manmade, radiates with a heightened sensitivity. The viewer becomes attuned to nuances of color, light, shadow, and texture that would prove elusive in both everyday perceptual experience and as rendered with other film stocks. If Dorsky shot with Ektachrome, for instance, his images would retain a photojournalistic quality in which objects may have beauty in and of themselves, but they would fail to achieve the transformative, metabolic shifts to which they aspire. Indeed, Dorsky notes that color negative stock "has greater strength as a medium for taking pictures, but I'm very much against taking pictures of objects. I want to transform the screen into an object of beauty."⁵⁴ Dorsky's handling of the Kodachrome imbues his images with a crisp, painterly allure that he refines from shot to shot, providing his films with aesthetic coherence and directly serving his devotional approach to cinema.

Much to Dorsky's dismay, Eastman Kodak discontinued Kodachrome in 2009. Given that Kodachrome was the last surviving color reversal stock, Dorsky was forced to transition belatedly to color negative. A note written for a program of his new films at Harvard Film Archive encapsulates Dorsky's ambivalence about the change:

It has been a period of adjustment, an attempt to find the affective beauty in the film stocks that have survived the demise of Kodachrome, a stock I had shot all my life. After two shorter attempts with the disappointingly thin Eastman negative, I ventured into the murky world of Fuji negative... Each of these emulsions has its own sense of poetry, its own attractions and emphasis within the world around us.⁵⁵

Dorsky's initial disappointment with the Eastman color negative stemmed from the fact that this stock is designed to be immediately transferred to a digital intermediate. Consequently, the emulsion is deliberately flat and the colors are neutral to allow for maximum post-production digital treatment. Because the stock is not made for finishing on film, it is more lifeless than

Dorsky is accustomed to, which is especially evident in the tentative, unresolved qualities of *Aubade* (2010) and *Pastourelle* (2010), Dorsky's first experiments with the stock. Surprisingly, Dorsky has only become more prolific since the cancellation of Kodachrome, completing 13 films in six years. Much of his productivity can be credited to three strategies that he has developed to simultaneously explore the unique strengths of color negative stock and replicate Kodachrome's contributions to his aesthetic: 1) to close down his aperture even more to make darker images; 2) to combine Eastman Kodak and Fuji stocks to maximize their capabilities; and 3) to adjust exposure over the course of his shots, essentially "forcing" the film to come to life.

When Dorsky switched to Fuji color negative, his first impulse was to explore the bottom end of the stock, attempting to reproduce the high-contrast look of Kodachrome. The Fuji stock shared an affinity with Kodachrome for deep, velvety blacks that had an almost embossed quality that seemed promising for visual transformation. The Fuji was 64 ASA, slightly more than a stop faster than Kodachrome, so Dorsky compensated by adjusting his internalized Kodachrome stops while shooting *The Return* (2011).⁵⁶ To his slight surprise, the film was extraordinarily dark, prompting critic Michael Sicinski to note that *The Return* "pushes the bottom, exploring the darkest reaches of the spectrum."⁵⁷ As in some of the Kodachrome films, Dorsky includes full-frame images of puddles in which the viewer can discern reflections of tree branches and sunlight, which gradually break apart, reorienting the viewer's perspective to the events onscreen. As Sicinski observes, in *The Return*, these puddles are often shades of black and gray. Moreover, the Fuji is expressive in the blacks, but not as florid as Kodachrome in the other colors, so the reflections within the puddles are more muted than in previous films. At one point, Dorsky includes an uncharacteristic landscape shot of a streetcar heading toward the horizon on a bright, sunny day, but even this image appears overcast.

In *Song* (2013) and *Spring* (2013), which rival the Kodachrome films in their delicacy and expressivity, Dorsky used all of the resources at his disposal, combining the Eastman Kodak and Fuji stocks to achieve color and contrast. The Fuji boasted thick, painterly blacks that flirted with artifice, but it suffered in terms of color differentiation. The Eastman Kodak was visually dull, but it offered more colors and, in contrast to the Fuji and Kodachrome stocks, showed promise when overexposed, especially in the yellows and greens.⁵⁸ This mix of stocks is evident in a series of Fuji shots in *Song*, in which faces emerge out of an enveloping darkness, gradually coming into focus, and in the green, yellow, and white seasonal palette of *Spring*. In what has proven to be a frustratingly reliable development, Fuji discontinued their color negative stock in 2013, which disallowed this hybrid approach.

In subsequent films, Dorsky has increased the number of aperture changes that he makes over the course of a shot to combat the flatness of the Eastman Kodak negative, introducing a new formal element to his films. In *Spring* and *Summer* (2013), Dorsky includes shots that begin in near darkness and gradually become infused with light, slowly opening up onto an image of flowers or branches, before slipping back into a cloak of darkness. In a poignant coda to Dorsky's thorough investigation of the sensitivities of film stock, he casts the range of aperture settings in his recent work as providing film itself with a showcase for its full potential in the face of its slow demise. "This is all the way up and all the way down," Dorsky explains. "In a way the films are very aware of why they exercise themselves as film. To show all that film emulsion can do, in terms of luminosity and darkness and middle range and everything. I'm very aware that [film] is still going through the camera so I'm letting film have its day."⁵⁹

For Peter Hutton and Nathaniel Dorsky, film's emulsion has painterly qualities that reveal themselves when the filmmaker is attentive to light, the camera, and even the rhythms of

his or her own body while shooting. Although the differences between Tri-X, Kodachrome, and color negative (even when these stocks are made by the same company) are vast and often constraining, their individual temperaments provide opportunities for filmmakers to harness them for distinctive and personal approaches to cinema, either to know the medium more intimately or to explore its sanctity. For other filmmakers, the emulsion's capacity for decay and its inscription of dominant social codes render it a site for the disruption of ideology. In the next section, 16mm is recast as the basis for progressive ecological and feminist political projects that challenge the emulsion's authority in perpetuating ideologically determined value systems.

After the Garden: The Aesthetics and Politics of Emulsion Decay

In the 1980s, avant-garde filmmakers became increasingly invested in the chemical properties of the film's emulsion. In addition to its painterly qualities, filmmakers began to see the specific chemical attributes of 16mm as determining the ideological content of the images themselves, and, like any other fundamental characteristic of the medium, a potential element for disruption, manipulation, or intervention. The fact that film needed to be processed before an image became legible produced a curious double bind. Because film stock was manufactured with a built-in set of protocols for processing designed to result in "quality images" as determined by convention and ideology, it served as another example of a technological constraint imposed by a corporation. That said, film processing was immensely variable with no two prints of a film looking exactly alike, which instilled the process with an ephemeral, auratic quality. Moreover, the influence of contemporary film theory enabled filmmakers to understand the images that resulted as already imbued with an ideological perspective on the world. Consequently, filmmakers could address these concerns by treating the emulsion as an unstable

element, the volatility of which could be channeled for aesthetic or political ends by submitting the filmstrip to a variety of chemical processes.⁶⁰

A roll of unexposed 16mm film (often referred to as “raw stock”) is composed of a flexible, transparent base, usually made of cellulose acetate, onto which is coated a photosensitive emulsion. For black-and-white stock, the emulsion consists of a colloidal dispersion of light sensitive silver halide particles throughout a gelatin. In addition to silver halide, the emulsion of most color film stocks contains three layers of dyes—yellow, cyan, and magenta—that are sensitive to certain colors of visible light. When the film is exposed, light reflected off an object is directed through the camera lens, where it strikes the silver halide crystals, which are activated in proportion to the amount and intensity of light. The hidden changes constitute a “latent image.” Although the process of developing the film varies depending upon the type of stock used, the basic procedure remains fairly consistent. In processing, the silver halide is converted into metallic silver by immersing the exposed film in a chemical bath that includes developer. In the case of color film, the developer will be oxidized to react with the dye couplers. After a certain period of time, the film is removed and run through a wash, or stop bath, which halts the action of the developer. If the filmmaker shot negative stock, the process would continue by immersing the film in another chemical solution called a fixer, which dissolves the remaining silver halide crystals, thereby stabilizing the image by making it insensitive to further exposure to light. The film now contains a negative image, which can be printed onto another roll of film to make a positive. If the filmmaker shot reversal stock, the remaining silver halide crystals would be re-exposed and redeveloped, resulting in a positive image.⁶¹

This simplified description of the basics of film processing is rehearsed to illustrate the precariousness of the filmed image. Because the image can seem commanding or authoritative in projection, there is a tendency to view it as a given, when in fact it is highly contingent. Even within the processing stage, failure to execute properly any of the steps in the procedure will result in a radically different image. If the film were left in the developer for too long, more of the silver halide would be converted into metallic silver, resulting in dramatically increased contrast. Without the fixer, the image would darken and fog. In color processing, incorrect temperatures could shift color values severely. Moreover, “finished” films that have been put into circulation never exist in a fixed state but instead remain in constant flux, susceptible to the vicissitudes of time, wear, and inevitable decay. Film preservationist and theorist Paolo Cherchi Usai argues that the destruction of the moving image is the indirect subject of the totality of film history. In Usai’s view, a film’s first projection establishes a Model Image, a kind of Platonic ideal of the film that future generations of viewers futilely attempt to restore. “The memory of perfection lost” and simple truth that no film, analogue or digital, is immune from decay, thus gives birth to the process that we call “film history.”⁶² According to this view, contingency is part of cinema’s ontological character at every stage of its development.

Guided by an awareness of images as ephemeral, conditional, and susceptible to decomposition, avant-garde filmmakers turned to the filmstrip to eulogize cinema’s inevitable dissolution. Tony Conrad pickled film by putting raw stock into a jar with vinegar so that the fluid acted as a lens through which viewers were forced to “watch” the film, an act that Conrad compared to “a virus being inserted into the system.” Conrad further explained: “I was trying to kill film. I wanted to let it lay over and die.”⁶³ By contrast, Phil Solomon experimented with homemade chemical treatments to melt the emulsion off the filmstrip as an act of recovery in the

face of cinema's impending obsolescence:

The Earth can only yield so much silver. In these environ/mentally conscious times, the time for recycling cinema products has come. After we have recycled the entire history of cinema (*recovered*, as we say), after we have ana/logged these hundred years of swirling bromide, we can move on into the cold digitized hell that awaits the lovers of the Magic Lantern.⁶⁴

Horried by the realization that her outtakes would become more manmade waste to plague her local landfill, Jennifer Reeves buried and exhumed strips of film, painting over the degraded images as an act of contemplating “the demise of the beautiful 16mm medium and nature’s losing battle to decompose relics of our abandoned technologies.”⁶⁵

In many ways, the approaches of Conrad, Solomon, and Reeves have art-world analogues in the painters and sculptors who incorporated non-traditional media, especially that which decays, into their practice. Ed Ruscha’s *Stains* (1969) consists of 75 sheets of white paper, each of which carries the trace of a household material, including coffee, tobacco, and gunpowder. Swiss artist Dieter Roth often incorporated food into his collages, sculptures, and installations, including salami, lard, and cheese. For his *Oxidation Paintings* (1977–78), sometimes referred to as the *Piss Paintings*, Andy Warhol recruited friends and associates to urinate on canvases covered in wet copper paint, which would then oxidize, usually turning to rust-and-green colored abstractions. Famously, Joseph Beuys’s sculptures and installations were made with a wide variety of organic and inorganic materials, leading a reviewer to write of a recent Beuys retrospective: “Here is congealed hare’s blood, rancid batteries, lumps of fat, a cloth apron-pocket of hardened wax and tallow that sags like some wretched udder, iron and sulphur and razor blades..., fat-splattered cardboard boxes, a bit of hardened blood-sausage like a lump of old shit.”⁶⁶

While avant-garde filmmakers may have been influenced by their art-world

contemporaries, film makes for an exceedingly potent medium for exploring the aesthetics of decay because deterioration forms an integral part of its ontological character. Even without artistic intervention, both the base and emulsion are vulnerable to chemical decay. In a guidebook designed to assist libraries, museums, and archives in preserving their film collections, The National Film Preservation Foundation recognizes seven common types of decay and damage, many of which are the result of poor storage and exposure to fluctuations in temperature. In addition to the wear-and-tear that stems from excessive handling, the filmstrip can also become a host for mold, mildew, or fungus. Acetate decay, commonly referred to as “Vinegar Syndrome,” can cause the emulsion to crack and the filmstrip to warp. As is routinely visible in color prints from the 1950s through the 1980s, fading and shifts in hue can be especially pronounced depending upon the stock. Film historians regularly lament the fact that a tremendous amount of our cinematic heritage has been lost because it was printed on cellulose nitrate, which disintegrates over time in aesthetically spectacular fashion.⁶⁷

Indeed, avant-garde filmmakers quickly realized that decay provided new opportunities for visual transformation as well as progressive politics. Decaying images invariably call attention to themselves as images, simultaneously invoking the history of the medium, as well as its ephemerality. Unsurprisingly, the medium’s status as a repository of ideologically inflected recorded history is closely related to found footage filmmaking. Invoking Walter Benjamin, William Wees notes that found footage films “are composed of visual quotations of history ... that have been ripped out of context and placed end to end according to the filmmaker’s theme or argument.”⁶⁸ The filmmaker is a conjuror who resurrects the discarded remnants of a schizophrenic culture and grants them new (and unexpected) life. In the words of filmmaker Standish Lawder, whose *Runaway* (1969) and *Dangling Participle* (1970) are core examples:

“Stripped of its original context, the shot becomes veiled with layers of speculation, subjective evocation and poetic ambiguity. Questions of intentionality and meaning become slippery... What was filmed remains firmly fixed, only now surrounded by a thousand possible new whys.”⁶⁹

In his survey of the subgenre, Wees argues that found footage films are most effective when “constructed according to the principles of montage or collage.”⁷⁰ By contrast, films that engage directly with the emulsion (even when combined with found footage) often minimize the role of montage in favor of an epistemological reorientation of the material itself through formal elements like color and texture. That is, the Kuleshovian impulse to make thematic meaning through the synthesis of successive shots, exemplified by the famous juxtaposition of a sailor looking through a periscope at a sexpot posing on a bed in Bruce Conner’s *A Movie* (1958), is less important than the fact that the images themselves are material records testifying to a living (or lived) presence, as well as an inscription of social or cultural norms. The aesthetic character of the decay itself takes the place of montage in bringing the viewer to this understanding.

Moreover, filmmakers were emboldened to politicize cinema’s raw materials as a result of developments in film theory. In addition to Bazin’s influential theory of the ontology of cinema, predicated upon the fact that the filmstrip is a material object that carries physical traces of the world with which it comes into contact, apparatus theory explicitly addressed the imbrication of technology and ideology.⁷¹ For theorists such as Jean-Louis Baudry and Jean-Louis Comolli, cinema’s technical base, conceived as the camera, projector, viewer, and projection situation, constitutes an apparatus that positions the spectator at its center.⁷² In contrast to the Structural/Materialist generation, the logistics of the system were less important for subsequent filmmakers than the perception that any photographic image comes with the ideologies that

informed its production already inscribed. “Couldn’t we thus say,” Baudry asks rhetorically, “that cinema reconstructs and forms the mechanical model ... of a system of writing constituted by a material base and a countersystem (ideology, idealism) which uses this system while also concealing it?”⁷³ Although this position is generally thought to be a refutation of the naturalism implied in Bazin’s conception of the medium, within the realm of avant-garde cinema, it exists as a correlate to Bazin; not only does the world leave its imprint in the film’s emulsion, but so do the sociocultural norms that constitute its unwritten laws.

In films by David Gatten, Jennifer Reeves, Naomi Uman, and Peggy Ahwesh, technological standardization, emulsion decay, and the historical contingency of moving images directly inform their incorporation of the 16mm filmstrip into their practice. In their work, the artist is figured as both archaeologist, unearthing forgotten or overlooked remnants of cinema’s past, and great revealer, locating the essence of the footage, ironically, through disarranging and disorienting the very chemicals that constitute its substance. In Gatten’s *What the Water Said, nos. 1–3* (1997–98) and *What the Water Said, nos. 4–6* (2006–07) and Reeves’s *Light Work Mood Disorder* (2006) and *Light Work I* (2006), the political aspect of the films is primarily ecological (although Reeves’s films also deal with gender politics), while Ahwesh’s *The Color of Love* (1994) and Uman’s *Removed* (1999) hijack the film’s emulsion to rewrite the destructive legacy of sexualized representations of women by male filmmakers.

Gatten’s *What the Water Said* project ingeniously subverts the hegemony of standardized image-making technology by circumventing it altogether. On three sets of consecutive days in 1997 and 1998, Gatten placed unexposed spools of film stock (primarily black-and-white and color print stocks, used to make prints from either negative or reversal originals) inside a crab trap, which was fastened to his ankle with a 50-foot rope. He then waded into the Atlantic Ocean

off the coast of Seabrook Island, South Carolina and threw the trap into the surf. Because the stocks had optical soundtracks, Gatten could be certain that the films would be visual and aural records of “what the water said” on a particular day—that is, anything that came into contact with the stock would carve its trace directly into the emulsion. With the exception of title cards featuring quotations from authors such as T.S. Eliot, Herman Melville, and Fernando Pessoa, Gatten refused to editorialize the material: “I didn’t edit the film; I put X amount of footage in the trap, and whatever the ocean gave me back is what I used.”⁷⁴ Therefore, Gatten devises a physical process to allow nature to speak for itself, as free from the impositions of technological standardization as possible.

Over the course of the year, Gatten made three films under different atmospheric and climatic conditions. In 2006, he returned to Seabrook Island to conduct the experiment three more times.⁷⁵ The results are widely divergent, depending upon the objects that buffeted the filmstrip on a particular day, as well as chemical variances in the types of stock used. The first experiment in *No. 1* (1/10/97), which was made with black-and-white print stock, is rather muted, mostly consisting of erratic white scratches and small white specks against a black background. By contrast, the three parts of *No. 6* (12/29/06, 12/30/06, 12/31/06) constitute a virtual fireworks display, with circular flashes of blue light, gorgeous blue flecks ensconced in transparent red triangles, and cauliflower shaped splotches of orange, blue, and white. Gatten’s careful inclusion of title cards indicating the date of each experiment call attention to the monumental differences from day to day, despite the fact that the films were immersed in the same small corner of the world each time.⁷⁶

Perhaps the most startling film is *No. 3* (high tide, ebb tide, and low tide on 8/22/98), which introduces an organic infusion of yellow highlights into a palette of deep purple. The film

was made with Eastman Kodak 7399, a color reversal print stock. Unbeknownst to Gatten, the submerged strips were exposed to pollutants from a photochemical developing plant up the coast, which released all of the dye couplers in the emulsion, activating all three layers. Consequently, the magenta, yellow, and cyan that are visible in the film are personal testimonies of chemical pollution.⁷⁷ In this way, *What the Water Said* is more than a clever conceptual or aesthetic exercise, but a profoundly politicized work of ecological cinema, as Gatten allows the ocean to advocate for itself through the film stock, much like a documentary filmmaker gives voice to a subject. In transcending the physical limitations of 16mm as it runs through the camera, Gatten reconceives technological constraints as possibilities, personalizes a de-personalized medium, and politicizes the film stock without relying solely on its reflexive dimension.

If *What the Water Said* gains power from its conceptual elegance, Jennifer Reeves's *Light Work Mood Disorder* and *Light Work I* combine chemical processes applied to the emulsion with a myriad of other techniques to produce a dizzyingly sensorial examination of science, medicine, gender, and the state of film in the 21st century. *Light Work Mood Disorder* is a paracinematic performance for two projectors created by Reeves in collaboration with composer Anthony Burr. Educational films depicting the mechanisms of early 20th-century science and industry, especially fragmented shots of assembly line processes, provide a base upon which physical alterations of the filmstrip are applied. In addition to traditional direct filmmaking techniques, such as painting and dyeing, Reeves put the filmstrip through a sewing machine, sewing patterns directly onto the film. Seen in magnified close-up, the puncture wounds left by the needle resemble giant popcorn kernels strung together on a necklace of thick rope.

Reeves also coated the filmstrip with her own concoctions of recycled pharmaceuticals, using them as an aesthetic and conceptual correlate to the medicinal imagery. Reeves's method

involved collecting expired prescription drugs and mixing them together in different combinations, similar to the process of making pigments. Reeves explained: “Because the prescriptions are based on different substances and powders, they sort of break apart differently as they dry, depending upon how you mix them, and [when applied to the filmstrip] they end up looking different due to the varying consistencies.”⁷⁸ In making earlier handpainted films, such as *Configuration 20* (1994) and *The Girl’s Nervy* (1995), Reeves learned that mixing incompatible water-based paints or drying them with hot air from a hairdryer made them more susceptible to cracking, mimicking the organic process of drying earth, as in a mud puddle that cracks when it dries too quickly. These magnified chemical textures are augmented in *Light Work I*, a shorter companion piece to *Light Work Mood Disorder*, in which they are paired with high-definition macrophotography of paints and dyes commingling, one substance infusing and diluting another in an amplified photographic imitation of the process of mixing pharmaceuticals.

In contrast to *What the Water Said*, which establishes a succinct, direct correspondence between analogue technology and a biological process, the *Light Work* pieces embed chemical processes within a network of related techniques that work together to suggest a unifying set of thematics. According to Reeves, the idea to sew the film stemmed from the realization that some of the first editing equipment was based upon sewing machine technology, since both necessitate intermittent advancement of the material. This approach recalls Annabel Nicolson’s *Reel Time* (1973), a projection performance in which the artist sewed film in real time as it passed through the projector, across the ceiling, through the sewing machine, and back into the projector, eventually being shredded to ribbons. Both Nicolson and Reeves’s processes invoke the longstanding debate between art and craft (especially in terms of gender) and questions cinema’s

place in relation to these technologies. The pharmaceuticals represent another artisanal, craft-based mode of filmmaking, in addition to suggesting the historical practice of marketing psychopharmacological medications to women as treatments for coping with the stress of “women’s work.”⁷⁹ By directly addressing the film’s emulsion, Reeves rewrites the D.N.A. of cinema’s gendered connection to its technology.

A feminist approach to the emulsion is also evident in two films that rework male-directed pornography to confront cinema’s representational codes. The first extended scene in Naomi Uman’s *Removed* begins with a badly dubbed invocation to both the viewer and the leering European male porn star who stares directly at us. “Come here!” commands the suppliant female lead, who shifts on the bed while her co-star literally looks down at her. As the woman reaches for his hand and the stereotypical lounge music swirls, we see that Uman’s treatment of the emulsion, in which the female figures have been systematically removed with bleach, has rendered the woman as a bulbous, swerving white mass. Although the woman’s form can be periodically glimpsed underneath, her masturbatory writhing mostly resembles a spectral amoeba being observed under a microscope. In addition, the areas of the frame around her body have been colored with red nail polish, which gives the sensation of dueling, shifting masses of color, as the discrepancies in application from frame to frame create a slight flicker effect. As the blob begins to masturbate with comical abandon, rearing up on her knees and throwing back her head in mock ecstasy (revealing that she is writhing on a bed covered in paper money), the scene becomes increasingly unsettling. The man sneers smugly, rubbing his mouth in both appreciation and entitlement, but the object of his gaze is a moaning, formless non-entity, a literal stain on the film where the body of a person used to be.

The second scene sets up a comic scenario involving the interplay between two

heterosexual couples. In a bedroom, an overweight man with a goatee masturbates his girlfriend, again rendered as an amorphous white void, while observing the sexual activity of another couple through a two-way mirror. hilariously, the conceit of the original scene—that the man will touch his partner while narrating what he sees through the mirror—is ironically undercut by Uman’s technique, in the sense that the features he voyeuristically describes are pointedly not the ones that we can see. Therefore, the second half of *Removed* becomes a meta-commentary on the process of watching the film itself, as the man’s excited descriptions of the physical features of a white blob enact a projection of erotic desire that seems entirely disconnected from the actual content of the images:

MAN: She’s almost finished removing her makeup. She’s admiring herself. She’s studying her body. She’s rubbing her breasts.

WOMAN: How are her breasts? Hard? Small? Like mine?

MAN: Bigger. Soft, white skin. He’s approaching her from behind.

WOMAN: What’s he doing now, Walter?

MAN: He’s pulling her panties off. His hands are wandering over her body. She’s enjoying it!

Throughout its running time, *Removed* shifts uneasily between at least three different registers. Most pertinently, the erasure of the female form forces the viewer to project his or her own fantasies about what the women actually look like. By subverting the expectation of titillation and engendering an awareness of our own desire to see the naked women, the film enacts the dynamic of the male gaze, made explicit in the design of the second scene. In terms of tone, *Removed* is, of course, comic, as the source material is like a cliché of a 1970s-era porno movie, complete with bad dubbing, terrible acting, and dated Eurochic décor. Then again, the film is also deeply disturbing. The bodies of the women are obliterated, but the men continue to act as though they’re turned on, full of machismo and sexual prowess as they get off on damaged, blotchy voids that aren’t too far removed from the titular alien from the fifties era sci-

fi film, *The Blob* (1958).

Although the political implications of *Removed* are immediately apparent, Uman's process was equally informed by an artisanal approach to the medium: "All of my work (including my films and my painting, sewing, embroidering) involves a respect for the handmade. My present life in a Ukrainian village means that I am surrounded by people who live by the work of their own hands."⁸⁰ Uman began the film while working as a projectionist at Cal Arts, where she was a graduate student. The source material was derived from a roll of 35mm film that student projectionists used as practice for learning to thread the projector. Guided by an interest in women's roles in pornography and a lot of down time at work, Uman began to apply nail polish diluted with Acetone to each frame, coloring the areas around the female bodies. Her intention was to bathe the treated film in bleach, which would eat through the emulsion in any area of the filmstrip that was not protected by the enamel in the nail polish. Paradoxically, then, the process of removing the women involved protecting everything else in the frame.

"It took a long time," Uman observes. "I carried the film with me wherever I went. I had a portable light box and a little bag with my supplies. It took me more than two years. I carried it around like my knitting, and I would work on it in the company of friends or in my studio. I had no idea what I was making until the whole film was finished." After the bleach had stripped away all of the female figures, Uman attempted to remove the nail polish with nail polish remover, but found that undiluted Acetone would dissolve the filmstrip completely. Consequently, she rephotographed the film from 35mm to 16mm on an optical printer, shooting through the nail polish, which accounts for the vibrating fields of red around the blobs.

Removed operates at the nexus of artisanal working methods, chemical treatment of the image, and the interrogation of gender codes as imbricated in found footage. In terms of the

former, the film is resolutely handmade, involving a painstaking three-step process of hand coloring the filmstrip frame by frame, immersing it in bleach, and rephotographing each frame on an optical printer. Each stage of this process necessarily entails working with the strip as material, something physical that can be dissected or shaped. On the other hand, the chemical process also serves to recontextualize the pornographic film, repurposing its intended function to challenge our assumptions about power, representation, and the male gaze. Moreover, the chemicals underscore the fragility of the emulsion, suggesting that the social codes embedded in the image are malleable, capable of being stripped away. These larger political implications are instantiated in Uman's working process, particularly in the dialectic between protecting the image with nail polish and obliterating it with bleach, highlighting the filmmaker's ability to harness the chemicals for her own ends. Ultimately, the nail polish itself provides the perfect emblem for the film: the enamel that facilitates the process of removal is derived from a readily available, gendered product, the marketing of which relies upon some of the same dubious notions of femininity present in the source material.

In contrast to Uman's exacting hand-coloring technique, the pornographic source material for Peggy Ahwesh's *The Color of Love* was discovered by the filmmaker in a dumpster, already in a state of decay. According to Ahwesh, "a friend of mine dropped off a so-called donation at Bard: six big boxes of cans and reels that had been left out in the rain. In all those boxes there was one reel of Super-8mm. I thought I might as well check it out."⁸¹ Ahwesh discovered that the reel contained two porn films, one with a vampire/horror theme and a less appealing "beach cabana sex romp thing." Even more interesting was the emulsion decay due to exposure, which had already produced many of the ornate aesthetic effects evident in the finished film. As Ahwesh explained to Elena Gorfinkel: "The film had been rained on and stuck together ... and

wouldn't go through a projector—the undulations in the picture (the rhythmic pulsing of the emulsion damage) comes from the fact that the area of the film being protected by the spokes of the reel looks pretty normal and the other areas exposed got damaged.”⁸²

For the most part, Ahwesh did not facilitate further decay of the image, leaving the damage essentially in the state that she found it. She did, however, amplify the floridity of the corrosion through rephotography: “Basically, I did an improv on the optical printer with the footage. I treat my machines almost like dance partners. I did two sessions on the printer and messed around, eyeballing it, slowing some sections down and speeding others up a bit, repeating some things, and elongating the cunt shots. And then I recut that material on the flatbed.”⁸³ In addition to adding repetition and changing the rhythm, Ahwesh made two other editorial interventions: She added a histrionic soundtrack of three tangos by the Argentinean composer Astor Piazzolla and concluded *The Color of Love* with the first shot of the second film found on the reel, so that the vampire material shifts abruptly to an ambiguous image of a woman masturbating culled from another source.⁸⁴

The film begins with an image of exquisite decay: a jigsaw-puzzle abstraction of black and green tiles infused with seepage of alabaster white and bloody magenta. As the camera pans left, the shapes solidify into an image of a curly haired woman clad in only a black bra and panties hovering over a lifeless man. She moves in halting slow motion, only to be obscured by intrusive bursts of splotchy green-and-magenta abstraction. The step printing infuses the movements of the bodies with a jerky quality; in contrast to the fluid, elegiac slow motion of a filmmaker like Phil Solomon, Ahwesh's optical printing has a disruptive effect, as though calling attention to the fact that an invisible interlocutor is calling the shots. A second woman, with long, straight black hair, undresses on the other side of the bed, an action that is swallowed up in

chaotic swirls of decay. The decomposition of the emulsion has the paradoxical effect of a beautiful affliction, both contaminated and painterly at the same time. The women turn their attention to the dead man, who appears to have blood smeared across his chest. As the women pass each other a knife, which they use to stroke and sculpt his genitals, decorative blotches of magenta, green and yellow decay spread across the image in rhythmic bursts.

The dead man turns out to be a limp pretext, as the straight-haired woman straddles his inert body while the curly-haired woman sucks her neck and breasts in a bit of presentational staging that emphasizes the film's theatrical qualities. The women's bodies are porcelain white, resembling the Undead, which adds a detached air to their sexual gyrations—there is an undercurrent of creepiness to the proceedings that makes it difficult to find the film titillating. As the camera moves in for a close-up on the curly-haired woman spreading apart and licking the other woman's vagina, Ahwesh slows the film down dramatically, so that we linger on the woman's vulva, which looks like a piece of raw meat. The emulsion decay now appears as two comblike vertical strips on either side of the image, dividing the frame into three roughly equal areas with sheets of decay encroaching upon the center, meeting and then retreating back to their edges, which several commentators have compared to a proscenium curtain being drawn over the image. As mentioned, the film ends with an incongruous insert of a woman with her shirt unbuttoned masturbating through white panties. Although still pockmarked with decay, the woman's warmer skin tone marks the image as from a different source than the vampire porn, seeming to suggest that the preceding scenario was the product of her erotic imagination.

If the reworking of pornography in *Removed* leads to a pointed criticism of the mechanics of representation, its use in *The Color of Love* is decidedly more ambiguous. While it is true that the sexual inertia, ashen bodies, and vampiric overtones of Ahwesh's film (as well as the

possibly satiric Piazzolla score) could be interpreted as a sardonic rejoinder to the uses of conventional pornography, the overall impression is one of the fragility of historicized images. The decay provides the uncanny impression of bodies stolen from the ravages of time, their frailty reanimated with material reminders of the eventual obliteration of all images. *The Color of Love* is infused with Paolo Cherchi Usai's contention that destruction constitutes the unwritten governing law of film history, which has led Elena Gorfinkel to argue that the film addresses conditions of cinephilia and erotic history through engaging "haptic visuality," a tactile and embodied form of seeing. Film critic Gavin Smith wonders: "These three people lived, and had souls and dreams. What became of them?"⁸⁵

The films discussed in this section highlight the most critical contributions of the "minor cinema" generation to a reconceptualization of 16mm: escaping its linearity and physical intangibility (Gatten, Reeves, Uman), developing handmade aesthetics that transcend direct filmmaking and reflexive paradigms (Gatten, Reeves, Uman), confronting the aesthetic and political dimensions of emulsion decay (Reeves, Ahwesh), approaching the emulsion as a repository of history and culture and site for feminist politics (Reeves, Uman, Ahwesh), and seizing new opportunities for perceptual transformation (all). But emulsion decay also appealed to filmmakers in the autobiographical, poetic, and personal traditions. In *Structural/Materialist* film, 16mm was presented as a fact, not a metaphor for ephemerality or decay. Subsequently, it became more common to use the filmstrip in an allegorical manner. This impulse is instantiated in the mournful symbolism of Phil Solomon, who uses chemical treatments to transform the images on the filmstrip into veiled allegories of personal heartbreak and historical anguish.

The Emulsion's Expressivity: Phil Solomon in the Elegiac Mode

Of the filmmakers to have taken up chemical treatments of the emulsion, Phil Solomon has most thoroughly recast these processes into an expressive register. In Solomon's films, chemical treatments are part of an array of techniques designed to transform original and found footage into elegies, exquisitely granulated laments for lost time, absent friends, and all that is dearly departed. In addition to their allegorical poignancy, Solomon's films, like those of Hutton and Dorsky, exhibit a fascination with the painterly aspects of the emulsion, often providing immersive sensual experiences that treat surface texture as metaphysical. Like many of the filmmakers discussed in this chapter, Solomon's chemical treatments are attempts to overcome a technological limitation—the power of the index. In Solomon's case, the referents in conventional photography are too strongly affirmed and need to be chemically denatured to accrue symbolic or allegorical potency. Therefore, the primary questions that Solomon asks in his films deal with representation and cinema's ability to universalize the particular. Consequently, the analyses of Solomon's films in this chapter are slightly more interpretive. If other filmmakers distress the emulsion for political ends, Solomon's manipulations are rooted in the personal tradition, striving for expressive tonality, autobiographical and allegorical resonance, and a paradoxical tension between the image as both revelatory and transient, as much a powerful record of what is as an ephemeral memory of what was.

Most overtly, Solomon's chemical treatments overwhelm his images with cascades of swirling grain that are at once sumptuous and terrifying. The chemicals shift prosaic images into the lyrical mode, highlighting their delicate textures while disguising other details that would ground them in actual or ironic terms. Solomon has suggested that the glue holding his images

together is “mood, atmosphere, air, emotional weather—a feeling. Intuition. Responding to what the images are telling me on a nonverbal level. ‘No ideas but in things.’”⁸⁶ Fittingly, Solomon’s films could be said to invoke moods. The logic of the transition from one shot to the next (the mechanics of which are usually obscured by chemically treated dissolves) is often enigmatic, but there is a confidence in the emotional coherence of the images and their textures that provides an impression of inevitability. To invoke Susanne Langer, whose *Feeling and Form* (1953) was deeply influential for Solomon, the chemical treatments become a means to move from actuality to abstraction, manipulated for expressive purposes to become a transparent symbol for the viewer.⁸⁷

Before experimenting with chemical processes, Solomon drew upon other techniques to bring out the expressive possibilities of his source material. One of Solomon’s earliest films, *What’s Out Tonight Is Lost* (1983), represents an inventory of strategies for poetically reshaping the image. The film’s first section is derived from home movies of a family outing to the coast. The original film has been subjected to biological decay, possibly from mold or rain damage, which creates a dense network of white scratches that ripple across the frames. These scratches sometimes outline the figures, providing a slight collage-like effect, as in the shot of a mother and child in matching sun hats separated from the coast behind them. At other times, they lend the image a mottled, distressed quality, as in the sequence of red-jacketed boys pushing a toddler on a merry-go-round. The emulsion damage is amplified by optical printing effects: the footage has been step printed (that is, slowed down), backlit, and shot through a blue filter, which further conveys a sense of aesthetic defamiliarization of the source footage.

More techniques are introduced in the second part of the film. Most prominently, shots of a woman lying in profile on the grass, a figure peering at a forest landscape through a viewfinder,

and two kids tentatively practicing a waltz step are rephotographed through a defective lens that makes lighter portions of the image shimmer with crystalline fields of bent light, recalling an Impressionist painting. Men working on a lighthouse and a lonely early morning schoolbus are shrouded in a dense fog (conjured by Solomon on the optical printer) that mimics the chemical deterioration of the earlier coastal scenes. As the film moves into a suburban landscape, polyvalent montage and subtle dissolves create the sensation of a lyrical weaving through time and space. In later films, Solomon employs chemical processes to produce similar effects, although the techniques used in *What's Out Tonight Is Lost* continue to play a role in his films—the defective lens is used more pervasively in *The Secret Garden* (1988), the blue filter is retained for *The Exquisite Hour* (1989), and the mold-induced scratching anticipates *The Snowman* (1995)—but they often modify and enhance the increasing reliance on chemical treatment of the filmstrip.

In addition, *What's Out Tonight Is Lost* is rife with coded autobiographical allusions, which are central to Solomon's use of chemical processes and working methods more generally. The film is clearly imbued with a wistful melancholy, although the source is difficult to locate. In fact, the family vacation footage was given to Solomon by a girlfriend who lived with him for the summer before departing for Princeton. Their shared time is invoked in the domestic scenes of the final third, as well as the schoolbus, a veiled reference to her return to school. Moreover, Solomon's mother had recently become ill, which steeps the home movies in a nostalgic longing for better days, the referent in the film's title to that which has been lost. Armed with this knowledge, it is easy to read the elderly woman staring through the viewfinder as searching for answers in the face of some kind of perceived threat.⁸⁸

Of course, this reading is unavailable for most viewers, who are likely to be unacquainted

with the autobiographical particulars. Nonetheless, Solomon's reliance on an illegible narrative thread has direct bearing on his turn to chemical treatments, in that his techniques are often methods for adding layers of aesthetic distance between himself and his personal experiences. In the midst of working on a follow-up to *What's Out Tonight Is Lost*, an uncompleted film entitled *The Summit*, Solomon felt compelled to address his mother's increasingly debilitating disease. Over the course of her five-year illness, Solomon made several trips to Florida, where he filmed her, but he remained ambivalent about the footage: "I felt *terrible* shooting her—she *hated* being filmed—but I had this primal need to preserve her in some way. Every time I looked at the Florida footage, the ostensible referent was so strong—it was so much *my mother* and not *film*—that I couldn't work with it. Aesthetics were beside the point."⁸⁹ Solomon's awareness that he could not make a film that directly addressed his mother's death was one impetus for experimenting more intensively with chemical treatments, which would allow him to pull from many different sources to make another coded autobiography through which he could acknowledge his profound sadness over the loss of his mother.

At first, Solomon experimented with immersing 16mm film stock in diluted bleach and removing the strip before the image was completely obliterated, but he discovered that the 16mm frame was wide enough that the chemicals would pool in the middle, resulting in dramatic inconsistencies. He was more successful with Super-8; if the strip was removed at just the right time and dried quickly with heat lamps, it would harden and cake but the image would hold, resulting in a kind of impasto. This allowed him to gather footage from a wide variety of sources, including his father's home movies, educational films gleaned from WGBH, and his own footage shot in Boston, New York, and Nebraska. This was a painstaking process: 16mm film needed to be rephotographed onto 8mm, chemically treated, and then rephotographed onto Double Super-8,

a Kodak stock that offered the resolution of 16mm with 8mm sprocket holes. During rephotography on the optical printer, Solomon applied other manipulations, including step printing, changes of scale, and lighting effects produced by sticking his fingers in front of the light on the printer.

The resultant film, *Remains to Be Seen*, has a texture that is dense and luminous, enveloping and secretive. The chemicals transform the image into a pointillist reverie, often recalling Impressionist painting due to the emphasis on the play of light over impasto. At certain moments, the film looks as though it were photographed onto a piece of paper that has been crumpled into a ball and flattened again. Like Impressionist painting, the cracked emulsion constitutes the image rather than covering it. Instead of the strategic application of bleach to isolated portions of the frame, as in Uman's *Removed*, Solomon washes the whole strip to provide a more immersive experience, conveying the sensation that the decay is the primary constitutive substance of the image itself. The Impressionists' valorization of movement as a fundamental characteristic of perception is literalized, as the camera movement present in the original footage combines with the texture of the emulsion to flutter as one image flows into another.

In the opening section of the film, which functions as a prologue, Solomon enigmatically shuttles between images of dark green trees against a royal blue sky, a solitary swimmer swept up in a massive tidal wave, and surgeons prepping a patient for the operating table. Although the potential for disjunction would seem great, the chemical treatments furnish the images with a consistency of texture that leads to graphic similarities between shots: the shimmering on the water matches that of the pink buds on the trees, and the pointillist orange-and-white of the operating room blends seamlessly with the roiling eddies of the tidal wave. The prologue

concludes with shots of a Midwestern landscape as taken from the point-of-view of a moving car. Barns, haystacks, and churches roll by as the windshield wipers click back-and-forth, the chemical process uncannily conjuring late-period Monet.

The progression of chemically treated images in *Remains to Be Seen* suggests such a strong allegorical thread that the film practically begs to be interpreted. A bicyclist rides across the landscape, the camera panning slowly to follow. Sounds of a breathing machine and electrocardiogram, ominous in their regularity, mark a return to the operating room. These motifs are recast as a series of solemn, evocative metaphors for death, especially in the sense of “passing over” or “passing through.” The bicycle rider journeys to the other side, the trees seem to reach for heaven, and the home movies turn from picnic to procession. Sounds of tidal waves punctuate an extended shot of a family crossing a long bridge over water, holding hands as if the boy is shepherding his mother across the final step of her long journey home. Shots taken from the side of a boat invoke burial at sea, while a group of three men, their figures in silhouette, erect a kind of funeral pyre or monument amidst a smoky blue-and-orange landscape. In the final shot, two silhouetted figures against the landscape evoke a parent-child relationship, as the boy slowly walks away, leaving his parent alone, framed against a curtain of crumpled blue sky. The chemicals provide a dense abstraction, as though the image has been projected onto tinfoil and coated with a layer of sea salt. Due to the chemical treatments combined with backlighting on the optical printer, bodies resemble specters of light floating through an Impressionist daydream. Many of the film’s motifs are eventually engulfed by their own chemistry.

Even without knowledge of the particulars, the chemical treatments in *Remains to Be Seen* have the effect of universalizing the personal, so that the images come across as heavily allegorical or metaphorical. A viewer may not know that Solomon’s mother died on the

operating table or that the boy holding his mom's hand on the bridge is actually Solomon and his mother, but they register as universal laments for Mother or Death. In reality, the men erecting the funeral pyre are workmen tarring a roof, but the chemicals transform them into allegorical stand-ins for the guardians of death and mourning. According to Solomon:

What most interests me in my work is to try and embed meaning whose source is initially propelled from utter privacy—personal information that people could never possibly decode or “get” unless I actually tell them the background tales. But I hope that something of the *feeling* gets through ... even though you're not privy to all the biographical details.⁹⁰

Considered in this light, the chemical treatments are Solomon's method for defamiliarizing the image. As the specificities of the source footage are chemically reconstituted, broken into thousands of swirling particles, the primal, talismanic import of the original comes to the fore. Even when the narrative thread is less personal, Solomon's images often seem like coded allegories. In *Clepsydra* (1992), for which Solomon applied the same bleach treatment to black-and-white emulsion, an educational film about how to tell time becomes a highly metaphorical treatment of repressed incest and hazy ritual.⁹¹

The imposition of aesthetic distance on the material is mirrored at the level of Solomon's working process, which tends toward the solitary. By decaying the emulsion and rephotographing the results in the optical printer, Solomon can meditate on each frame, considering the personal and allegorical weight of his images. Solomon explains:

Original photographed moments, often teeming with life, are frequently rendered [by optical manipulation] into *analysis*, so that we are no longer in an aesthetic present tense, but are made passive by *watching the watcher watch*... We see what *the filmmaker has already seen and noted*, we now know what they have already known... We begin having a *secondary experience* rather than a primary revelation.⁹²

In this passage, Solomon imagines himself as a voyeur in search of the transcendent moment, poring over images one frame at a time to bring out their revelatory potential. In contrast to a

filmmaker like Stan Brakhage, who often seems to be bringing the world inside of himself, sifting it through his own consciousness, and projecting it back outward in a flurry of activity, Solomon's process involves introverted contemplation of the image, held at a layer of remove through the chemical treatments.

Following *Remains to Be Seen* and *Clepsydra*, Solomon had difficulty replicating the results of the bleach treatments. Several years after completing *The Snowman*, which augments biological deterioration already present in a former student's home movies, he discovered a new process that allowed him to pursue more intensive emulsion decay. Solomon credits a former student and talented chemist, Robert Schaller, with introducing him to the basic principles of Mordançage, a nineteenth century process sometimes called "etch-bleach" or "gelatin relief." In its traditional form, Mordançage alters the tonality of images by using chemicals to lift the emulsion from its base, oxidizing it in the process. Initially, Shaler experimented with stripping all of the emulsion off the film, leaving light gelatin outlines of figures. Given his interest in dense images packed with detail, Solomon mastered a modified process of removing the filmstrip from the bath before the chemicals wiped the silver off completely, essentially letting the film's emulsion dry upon itself, producing a thick layer that resembled a welt. To Solomon's surprise, the emulsion retained the fidelity of the original; instead of a jumbled mess, he had legible images surrounded by a bronze-gold chemical soup, which he could paint with a brush for more specific results. Solomon discovered that, given certain conditions in the source material, the cracked texture of *Remains to Be Seen* could give way to a roiling chemical inferno out of which images could arise and disintegrate.

In making *Remains to Be Seen* and *Clepsydra*, Solomon had learned that obtaining aesthetically desirable results hinged upon a knowledge of how variances in the source material

would react to the treatments. For instance, overexposed images did not respond particularly well to the chemicals. Dissolving from one image to another *after* the strip had been treated ensured consistency of tone, which proved essential when juxtaposing material from a wide variety of found footage. The Mordançage process only solidified the importance of controlling the chemicals. If the strip was left in the chemical bath for too long, most of the image would disappear. Furthermore, the chemicals react specifically to blacks, which necessitated the use of relatively high-contrast black-and-white source footage. Even with the “right” material, the sheer number of variables guaranteed a heavy degree of uncertainty. If the chemical immersion was guided by intuition or rigorously dictated by the clock, if a particular batch was stronger or weaker than another, if the strip dried horizontally or vertically—as in basic film development, all of these factors served as constant reminders of the emulsion’s fragility. In that respect, Solomon’s films can be seen as process-based illustrations of the fact that the filmic image is highly contingent, capable of being devoured from the inside by slight deviations in its own chemistry.

After mastering this new process, Solomon began his most ambitious film up to that point, *Psalm II: “Walking Distance”* (1999). The film represents the culmination of Solomon’s method of chemically defamiliarizing an increasingly dense and puzzling series of referents to force autobiography into the realm of allegory. The opening image, coupled with an ambient drone that sounds like a freight train under water, is both evocative and terrifying: a man hangs upside down, suspended in a cocoon, his blanched and formless body writhing against a roiling orange backdrop of globular lesions. A shot of what appears to be pulsating liquid metal, broken into pieces, anticipates a return to the hanging man, whose body effortlessly disintegrates as it begins a spectacular descent through oxidized rust. If the chemicals in *Remains to Be Seen* recalled

Monet, “*Walking Distance*” references the grotesquerie of Francis Bacon by way of the cracked moodiness of Albert Pinkham Ryder.

The surface texture of *Remains to Be Seen* shared an affinity with craquelure, as though aging had split a pre-existing image into pieces. The Mordançage of “*Walking Distance*,” on the other hand, creates an agitated, restless surface that seems to give birth to the images only to unexpectedly sweep them away again, providing the sensation that bodies solidify for a few seconds before they are dragged back into the chemical soup.⁹³ The unmistakable outline of a skeleton dances into frame left, almost as though he has been scratched into the emulsion with a nail. Later, the film seems to depict a horrifying submersion in water, often from the point-of-view of a drowning man looking upward at the water’s surface in a desperate attempt to breathe, an impression that is reinforced by the accompanying sounds of a water-based struggle. The chemicals render the water as a black void with rippling orange and white cracks dotted across the frame. Periodically, the soft outlines of figures emerge from the darkness, as if hallucinations from the drowning man. This represents the longest sequence of almost pure abstraction in Solomon’s films, the chemical treatments forcing the images into a register of suggestion, inference, and insinuation.

A deathlike apparition, eyes devoid of substance and addled by clusters of decay, initiates a major sequence, which depicts a man shrouded in white struggling through a molten, twisting landscape. The chemical treatments now suggest panoramic landscapes, with craggy rock formations spontaneously rising and falling out of a liquefied, igneous ooze. An oxidized dust storm threatens to sweep away everything in the frame. It becomes increasingly evident that the film has become an apocalyptic nightmare of fire and ash, which is crystallized in the film’s most frightening image, a return to the extreme close-up of the man’s face, now twisted in

agony. He lets out a silent scream before he is swept away by the alchemical blaze. The deluge is followed by relative stillness and a sense of contemplation. Beyond a thick layer of aqueous liquid that recalls paint being poured out of a can, a supine man lifts his arms to the heavens, as though trying to rise from charred ruins. The surface texture consists of a sumptuous orange and black that bends into vertiginous knotted spirals, black holes that possess the viewer with the uneasy feeling that he or she could somehow fall into them. From among the rubble, a tightrope walker emerges, holding a long stick to keep his balance from falling off the face of a scorched earth. Unexpectedly, a family appears, as though posing on an outing to the beach—the shirtless father holds his son on his shoulders, his wife and daughter beside them. Kids whiz by on a merry-go-round, but the images seem to burn, as though someone took a match to the family photo album. The flames beset the tightrope walker on all sides, and in the film’s final image, the chemical sea arcs toward the center, like a waterfall taking everything with it as it tips over the edge.

More than any other of Solomon’s films, the sources and referents for “*Walking Distance*” are almost maddeningly opaque. In the late nineties, Solomon grew tired of raiding his own biography for source material and embarked upon an ambitious series of films that he dubbed *Twilight Psalms*. Inspired by Robert Wilson’s associative riffs on historical figures, such as *Einstein on the Beach* (with Philip Glass, 1976), Solomon decided that each film in the series would reflect upon the newly terminated twentieth century by using an historical personage as a point of departure for poetic rumination. Additionally, the films would be thematically (and nominally) related to episodes of *The Twilight Zone* (1959–64), a show that had made an indelible impression upon him as a child. For this film, the reference points would be “Walking Distance,” an episode about a man’s attempts to give advice to his younger self, and Harry

Houdini as emblem of the 20th century, especially as played by Tony Curtis in George Marshall's biopic, *Houdini* (1953).

As Solomon was experimenting with applying the Mordançage technique to some of Houdini's daring escapes, including freeing himself from a straitjacket and being trapped under ice, he learned that he had inherited a potentially life threatening genetic disease that affected his ability to breathe. Suddenly, Solomon found himself face-to-face with his own mortality and unable to ask his deceased parents for advice. Around the same time, he heard a (probably) apocryphal story that Houdini freed himself from his submersion under the ice by following his mother's voice, which led him to the light. Despite his intentions, "*Walking Distance*" became another coded autobiography, with the chemical treatments allegorizing a painful internal struggle. Solomon's mother also had scleroderma, a skin disease that made her susceptible to extremes in temperature, which, reinforced by themes present in episodes of *The Twilight Zone*, accounts for the apocalyptic shifts in temperature and landscape suggested by the Mordançage. The posing family that seems to burn at the end of the film is Solomon's own, and the tightrope walker—culled from an IMAX adventure film featuring The Great Blondin—is easily read as straddling the line between life and death, the flames rising to meet him on either side.⁹⁴

As in Solomon's previous films, the chemical treatments serve several functions. On the one hand, they defamiliarize the original footage, allowing Solomon to string together an obscure narrative thread by drawing from aesthetically disparate source material. On the other, they tend to allegorize the images by stripping them of their particulars to represent them as essentialized: "the cocooned man," "the skeleton," "the funeral parade," "the treacherous landscape," "arms raised to the sky," "the tightrope walker," and all of the associations these archetypes suggest. In earlier films, the images retained some resemblance to the originals, although certain haptic

aspects like texture, grain, color, and decay were magnified or heightened. In “*Walking Distance*,” the Mordançage almost completely transforms the image, making Solomon’s film qualitatively different from the material from which it is drawn. The overwhelmingly ornate textures, the grand scale of the decomposition, and an emulsion that at one point was literally liquefied encourage Solomon to indulge in pure painterly abstraction far more than in any of his previous films.

Echoing some of the concerns of contemporaneous film theory, Solomon’s work with 16mm entails a simultaneous belief and disbelief in the image—a conviction that it is possessed with revelatory power, capable of attuning us to the sensitivities of the world, but also armed with the knowledge that it is always mediated, ideologically tainted from the beginning. Solomon’s cinema makes this dual conviction markedly apparent. Found footage is treated as archaeologically and ontologically “true,” in the sense that it marks someone’s presence, but also unstable, threatened, and subject to decay. In all of Solomon’s films, there is a faith that former loves, departed family members, and primal childhood feelings of innocence and despair can be accessed through images that both literally represent and figuratively allude to their existence, but the chemical treatments always forbid admittance, serving as constant reminders that photographs tell only one version of the story.

This becomes inflected with a more historical cast in Solomon’s recent work. In keeping with the original conception of the *Twilight Psalms* project, Solomon’s post-millennial films are less autobiographical, consisting mostly of reflections upon historical events and personages, treated allegorically through variations on the Mordançage process.⁹⁵ For instance, *Psalms III: “Night of the Meek”* (2002) deals with the Holocaust through the motif of monstrous automatons who threaten young girls, chemically reconfiguring iconic images from *The Golem* (1920),

Frankenstein (1931) and *M* (1931) to suggest Anne Frank, a social order rooted in obedience, and the technocratic hubris involved in purifying and controlling human society. As usual, the black-and-white footage is allegorized through a chemical process that often resembles swirling satellite weather patterns, but it is also criticized—the images do not possess the expected sense of longing or nostalgia, but are treated as simultaneously powerful and suspect, tainted by their own seductive potential.

The dialectic between belief and disbelief in the image, as instantiated in the chemical makeup of the filmstrip, is raised to a level of high tension in *American Falls* (2000–2012), a monumental, roughly chronological journey through American history originally commissioned as a six-channel installation at the Corcoran Gallery in Washington, D.C. Running almost an hour, *American Falls* chronicles a series of American tragedies using a variant of Mordançage that makes the images more legible, mostly drawing from iconic images of historical people, places, and events, including Niagara Falls, Abraham Lincoln, industrialization and oil speculation, World War II, and the Kennedy Assassination. *American Falls* illustrates the tenuous relationship between the emulsion and the “content” that it carries. According to Solomon:

What I am doing with the chemistry both metaphorically transforms but also critiques the monumental iconography of the imagery. Because the cracked and chemically distressed nature of the imagery makes it feel like it is all just a temporary mold and could eventually dissolve back into the soup of the emulsion at any minute.⁹⁶

The same principle holds true for the home movies that are rendered so delicately in Solomon’s earlier work: The chemical treatments render the image both beautiful and forbidding.

For Solomon, the technological constraints of 16mm reside in the strength of the referent. Built-in lens systems and standardized chemical formulas result in images that have lost much of their potential for allegorical meaning. Consequently, Solomon repurposes the emulsion’s

capacity for decay for the personal filmmaking tradition. In his cinema, 16mm is a tangible autobiographical record that can be shrouded in painterly veils of emulsion, lifted from its base and placed back upon itself in a process that serves as a metaphor for the ravages of time and memory. Other members of Solomon's generation were also interested in connecting the autobiographical with the physical dimension of the filmstrip. In the cinema of Luther Price, film is treated as a sculptural object, susceptible to a full-scale physical assault. In this instance, a different set of constraints—including 16mm's intangibility and linearity—serves as the impetus for an emphasis on working process, film's objecthood, and its connection to a personal cinema.

Luther Price and Film's Objecthood

Luther Price's *Porcelain Ribbon* (aka *Porcelyn Ribbon*, 1990) is a truly enigmatic film. Around 1989, Price found a discarded piece of Super-8 footage of a woman trapped inside a car as it falls off a cliff. Although he only recovered 96 frames or so, it was fairly clear that the image depicted the woman screaming as the realization of her predicament sinks in. Price sent the film to his lab, Super8 Sound, and asked them to loop the footage so that it extended to the length of a ten-minute reel. The loops came back in several strips, and Price assembled the five-minute film by cutting all of the first frames together, then all of the second frames, then the third, and so on, until every single frame in the film was spliced together with tape. The result is fascinating and puzzling—the viewer is never entirely certain what he or she is looking at, as the woman's facial expression changes in barely perceptible incremental bursts, and the context of the car wreck is entirely absent. Whereas most filmmakers would simply rephotograph the frames on an optical printer, Price elected to splice each one, resulting in a film of approximately 7,000 splices. "It's got to be the craziest thing I've ever done," Price later remarked. "My head

was different back then, to attempt that kind of physical attack to the film.”⁹⁷ Miraculously, Super8 Sound was able to make a print of the film, despite the fact that the original feels like lizard skin to the touch. Why submit the film to such a systematic assailing, especially one so painstaking and laborious?

Since 1986, Price has built a considerable reputation upon such extremities, both in terms of the content of his original and found footage imagery and intensive working processes that push film’s objecthood to its limits. In terms of the former, Price has developed a consistent set of thematics that amount to a personal mythology: family, death, decay, clowns, brutality, surgery, male homosexual sex, pornography, maggots, insects, toilet plungers, and substances that include lard, raw meat, candy, blood, and glitter. In terms of the latter, Price has explored the sculptural dimension of the filmstrip by drawing upon obsessive, repetitive processes more common to the studio arts; his films are pasted together, decayed in his garden, hole-punched, covered in powdery residue, and sometimes twisted into unrecognizable shapes. Ed Halter, who included Price’s work in the 2012 Whitney Biennial, observes that Price’s cinema is devoted to “the film itself as a kind of object. You’re always aware that there is a strip of film going through the projector.”⁹⁸ Moreover, Price showcases the unruliness and precarity of this process to the degree that screenings of his films are endurance tests for the projector; in the words of archivist Andrew Lampert, the films “thwart notions of what the medium can stand.”⁹⁹ In this section, *Meat* (1992) serves as an example of Price’s use of splicer, tape, and hole punch to connect film’s objecthood with the autobiographical or diaristic tradition of avant-garde cinema, as well as his emphasis on working process as a means to overcome the filmstrip’s inherent linearity.

Earlier in this chapter, I argued that some filmmakers have devised methods for circumventing the linearity and intangibility of the filmstrip, from Peter Hutton’s intimacy with

Tri-X's exposure latitude to David Gatten's submersion of 16mm in the ocean. Price, who has a background in sculpture, confronts this problem by subjecting original and, more often, found footage to a barrage of physical modifications. "I want to molest film," Price admits. "I'm much more a 3-D....guy.....I like the tactile elements.....of things and objects."¹⁰⁰ An important component of Price's working process is his recycling of footage. Outtakes from his films are buried in his garden, rotted in the sun, painted and glittered and converted into glass slides, or otherwise physically altered and incorporated into other projects. Consequently, Price has developed something of a reputation for making unprojectable films, although this is not entirely accurate. That said, Price confesses that he has "been working film to its limit before it becomes Frankenstein's Monster."¹⁰¹

Therefore, Price's working process involves exploring a set of ideas, themes, or concerns through the physical manipulation of an object, most commonly the Super-8 or 16mm filmstrip itself. Price gathers material that speaks to him on a thematic or autobiographical level, which establishes a set of parameters for a given project. The act of making the film serves as the actual exploration of these ideas, as Price works them over, literally and figuratively, until they crystallize into some shape. This mode of working may account for the fact that the two adjectives most commonly used to describe Price's films are "repetitive" and "obsessive," reflecting the degree to which Price's reworking of the filmstrip seems rooted in some kind of psychological necessity. While footage provides the initial impetus, the process of realizing the film is exploratory, rooted in small-scale aesthetic problems and methodological decision-making. For Price, this constitutes the "work" of artmaking, which is to some degree more important than the finished product.

There are some precedents within the avant-garde for Price's desire to overthrow film's linearity through a connection with his own body. Carolee Schneemann, for instance, incorporated the filmstrip directly into her process, describing the act of artistic creation as "a meeting, head-on, with some subject or material that can then become the process out of which a work develops."¹⁰² From 1965 to 1967, Schneemann filmed her domestic and sexual life with the composer James Tenney, capturing images of their coupling within the context of the changing seasons and their shared lives together as artists and lovers, reworking the filmstrip by painting, etching, bleaching, and baking it in an attempt to capture the intense physicality of the relationship. In *Fuses*, the fact that Schneemann touched the strip, leaving marks and making traces on the material itself, is not a superaddition or augmentation of the images, but an essential component of the film's ontological character. Her treatment of film as a sculptural object that exists in relation to the content that it carries transforms her materials into emphatically physical markers of her emotional state.

Schneemann is also an important precursor to Price due to her extension of handmade processes into the diaristic or autobiographical realm. For Schneemann, this is a phenomenological impulse, whereas one senses that the impetus for Price is psychological. Nonetheless, both artists link the objecthood of their materials with affective states stemming from their personal experiences. At first glance, Price's films would not seem to be "diary films" at all, in that they bear few of the hallmarks of the mode, such as gestural, handheld camerawork, an emphasis on the rhythms and routines of daily life, or first-person address. But many of Price's films can be read as catalogues of his emotional states or motivated by his autobiographical particulars. Crucially, however, Price often abstracts the details by using found footage that relates thematically to events in his life. As in the case of Phil Solomon, knowing

Price's biography is not a prerequisite for appreciating or understanding his films, but considering that it closely relates to his use of 16mm, a brief outline of Price's life and work is worth recounting.

Price and his sister, Sally, were raised in Boston in the 1960s and 1970s in a tight-knit family. At the age of 23, Price was accidentally shot at close range with an assault rifle on a school-sponsored trip to Nicaragua. This traumatic near-death incident, along with a subsequent infection, left Price with partial paralysis in his right leg and lifelong, nearly constant pain.¹⁰³ In 1986, immediately following the shooting, Price shifted from jewelry making and sculpture to film, where he made a number of autobiographical films in Super-8 under the name Tom Rhoads.¹⁰⁴ After adopting a new moniker, Luther Price, the artist garnered attention for a series of psychosexual performance films, such as *Sodom* (1988–89), *Clown* (1991–92), and *Meat*, that included distressing (and distressed) images of surgery, gay pornography, and extraordinarily fragile physical and emotional states of being. Between 1999 and 2001, Price's sister, father, and mother died of cancer. As a way of working through his grief, Price produced a number of very dark "cancer films" that pore over details of his family life, including *Door #2–37* (1998), *Home* (1999), *Mother* (1999), and *Ritual 629* (1999).¹⁰⁵ In 2004, Price shifted from Super-8 to 16mm, making one-of-a-kind originals that are derived entirely from found footage. Many of these films delve into the same subject matter as their predecessors, but they feel less heavily psychologized or overtly autobiographical. As Price himself and Ed Halter have noted, his ambition in these works has been to shift his earlier concerns into the realm of the mythic or symbolic instead of the autobiographical.¹⁰⁶

Of his earliest films as Luther Price, *Meat* most clearly suggests the relationships between Price's biography, the sculptural potential of the filmstrip, and a meticulous working process that

visually transforms found footage and reconfigures many of the medium's inherent constraints. It is also one of the more physically and emotionally demanding of his films. *Meat* is a densely edited, 55-minute examination of the body as a porous, penetrable hunk of meat, susceptible to all manner of invasive activity. The bulk of the footage is drawn from two sources: an instructional film for surgeons on how to prepare for and properly perform an operation, and images of Price lying naked and frail on a hospital bed with tubes jammed into his nose. Although the film is silent, doctors and nurses, many of whom are dressed in regulation blue scrubs, demonstrate hospital protocol, including how to prep the body for surgery. This is intercut with footage of an actual surgical procedure, as gauze is pushed into and pulled out of a bloody, gaping hole in close-up. Meanwhile, Price writhes on the bed in agony, with the intercutting suggesting that *he* is in fact the patient undergoing surgery. We also see Price in other guises, sometimes making grotesque facial expressions with his head shaved and face painted blue, and other times wrapped like a mummy and eating raw meat. The film is further punctuated by close-ups of flies and homosexual anal sex, sometimes in the same frame.

Due to its aggressive, obsessive, and often repetitive nature, it would be difficult to view *Meat* and fail to grasp its major concerns and preoccupations. The film seems heavily autobiographical, a clear attempt to come to terms with the experience of being shot. Above all, one is left with the impression of the body as little more than a hunk of meat and flesh, covered with orifices to be stuffed—with scalpels, gauze, fingers, and genitals. It is also something to be poked and probed, explored and investigated, and capable of undergoing and withstanding severe trauma. *Meat* also features the most controversial aspect of Price's early films: an ambiguous and disturbing depiction of homosexual sex, in which Price's bodily desires seem to be equated with punishment, torture, insects, and degradation.¹⁰⁷ Of course, the images of an emaciated Price as

he lies writhing on a hospital bed combined with footage of gay sex suggests that the film is haunted by the specter of AIDS. Like many of his other Super-8 films, *Meat* is also about performance, both by Price and the surgeons, who (in the original footage) are performing their roles for the benefit of aspiring doctors.

If these constitute the set of ideas, themes, or concerns that Price explores in *Meat*, then how are they “worked through” in relation to the materiality of Price’s medium, Super-8? In keeping with his background in small-scale metalworking and sculpture, Price develops a number of filmic techniques that exhibit a propensity for treating the Super-8 strip itself as an object to be physically manipulated. Perhaps most conspicuous is the film’s grimy texture, almost ornate in its battered, grid-like appearance, as tiny networks of dirt and smudge come together, break up, and re-form at 24 frames per second. In a laborious and painstaking process, Price methodically wrapped each individual frame in Scotch tape, creating a “skin” or “casing” that covers and holds the entire film. Price would often spit on the film before wrapping it, which accounts for the globular, cell-like grid that impresses itself upon the surface of the strip. In other instances, Price bleeds onto the film before taping it, which renders the film a kind of medium for the preservation of his bodily fluids. If the surgical footage forges a thematic link to Price’s biography, this connection is further solidified by a physical process that binds Price’s “insides” with the film’s “outside.”

In addition to the taping, Price also includes images-within-images, achieved by perforating the frame with a standard hole punch and placing items, like dead flies or other bits of film, inside the holes. This technique shares obvious affinities with collage, as well as recalls Brakhage’s similar treatment of the filmstrip in Parts II and III of *Dog Star Man* (1964), although the use of the hole punch renders Price’s perforations more emphatically circular. Most of the

images and collaged objects inside the holes are only affixed to a single frame, so the effect in projection is one of rapid animation occurring in an isolated portion of the image, set against a backdrop of “normal,” more fluid motion. The fact that the images inside the perforations are frequently of raw meat or gaping wounds combines with the spit bubbles to give the overall impression that the film is covered with open sores. Price’s original of *Meat* was so heavily collaged that his lab, despite being very amenable to unorthodox jobs, could not print the film. Instead, *Meat* was transferred to video and mostly exhibited in that format.¹⁰⁸

The importance of therapeutically working through his personal experiences at the level of the filmstrip is instantiated in Price’s elevation of working process, which he holds to be more important than the completion of the film as a fixed object. “Process is everything to me,” Price observes. “It’s so much more important than the actual piece.”¹⁰⁹ Similarly, Price notes that “the remnants of process are always important.....It’s not always about what you are working on.....but how it gets there.”¹¹⁰ Price claims to have discovered this early in his career. While his peers were on Holiday Break, Price took over the plaster room at MassArt, where he intended to make 100 dead babies from plaster baby doll face molds. After working for a few days, with the studio full of baby dolls and bowls of mixed plaster in various stages of disarray, Price realized that the actual piece was the studio itself as it reflected different facets of the process of making the babies rather than the static forms that they eventually became.¹¹¹ This lesson translated to his later filmmaking career. Price does not submit to film festivals or necessarily show every film that he makes; when Halter programmed his films for the Whitney Biennial, he discovered that Price had made dozens of handpainted films that he had never actually seen himself. According to Halter, Price “produced many of these films without actually watching them—he just kept making them.”¹¹²

Like Phil Solomon, Luther Price has turned to the filmstrip to explore his own life, repurposing techniques associated with handmade cinema for the personal tradition. But Solomon's decayed images are ornate and sensuous, whereas Price's are battered and visceral. By taping, hole punching, and bleeding onto the filmstrip, Price has connected film's objecthood to his own body and developed his working process in relation to some of the medium's most fundamental constraints, its inaccessibility and linearity, both inside the camera and during projection. In fact, Price has described himself as a collaborator with his own process: "I find myself a collaborator.....The process and I.....These days I listen..... And we work together.....For the thoughts I might have."¹¹³ In that sense, Price's cinema fits squarely within the parameters set forth by the post-Structural generation of "minor cinema" filmmakers who innovated a variety of methods for turning the medium's constraints into artistic possibilities.

Conclusion

The close association between avant-garde filmmakers and the 16mm film gauge is indicative of the fact that, for most artists, film is not simply a passive recording medium. Instead, the material dimension of the filmstrip provides opportunities for visual transformation, painterly images, ideological disruption, and formal and conceptual innovation. Most scholarship has discussed this in terms of the handmade or Structural/Materialist paradigms, but this chapter has argued that subsequent generations adopted a range of approaches to the constraints of 16mm. Peter Hutton and Nathaniel Dorsky seized upon the qualities of particular film stocks and made them important components of their painterly aesthetics. Film's capacity for decay encouraged a number of political responses, especially ecological and feminist, to the

contributions of technological standardization to enforced ideological perspectives. Phil Solomon extended decay into the autobiographical, allegorical, and elegiac realms, while Luther Price destroyed the linearity of the filmstrip through physical assault, linking his body to the medium's objecthood.

But shooting or reworking 16mm was only the first part of the process. After the film had been shot, it needed to go to the film lab for processing, workprinting, answer printing, and a litany of other possible procedures. While going to the lab was often considered the duller aspect of the filmmaking process, this was an arena marked by constraint, compromise, and technological standardization that threatened the autonomy of avant-garde filmmakers. Surprisingly, many artists learned that technicians could play collaborative roles in their practice. In the next chapter, I examine the complicated relationships between filmmakers and film labs to trace some of the aesthetic and cultural contributions of film labs to avant-garde cinema, which encompassed film form, sexual politics, and, improbably, the Mafia.

¹ James Kreul discusses the rationalization of the 16mm film industry and its effects on the American avant-garde in Kreul, "New York, New Cinema: The Independent Film Community and the Underground Crossover, 1950–1970" (PhD diss, University of Wisconsin-Madison, 2004), 18–23.

² For an analysis of *Standard Gauge* along these lines, see Scott MacDonald, *Avant-Garde Film: Motion Studies* (Cambridge: Cambridge University Press, 1993), 54–64.

³ Recently, Tom Gunning has argued persuasively that film theorists' preoccupation with "indexicality" stems from a misreading of the semiology of Charles Sanders Peirce. By raising the specter of cinema's indexicality, I do not mean to take a particular stance on an issue that has preoccupied film theorists for decades, nor do I intend to ascribe any such position to avant-garde filmmakers. I simply contend that, on a practical level, the fact that the pictures on a roll of film often strongly resemble the objects or events at which the filmmaker pointed the camera can be construed as a bind. See Tom Gunning, "Moving Away from the Index," *differences* 18.1 (Spring 2007): 29–52, and Tom Gunning, "What's the Point of an Index? or, Faking Photographs," in *Still/Moving: Between Cinema and Photography*, eds. Karen Beckman and Jean Ma (Durham: Duke University Press, 2008), 23–40.

⁴ Schneemann quoted in Scott MacDonald, "Interview with Carolee Schneemann," *A Critical Cinema: Interviews with Independent Filmmakers* (Berkeley, Los Angeles, and London: University of California Press, 1988), 137.

⁵ Gregory Zinman, "Handmade: The Moving Image in the Artisanal Mode" (PhD diss, New York University, 2012).

⁶ See P. Adams Sitney, "Structural Film," *Film Culture* 47 (Summer 1969): 1–9. A revised version of Sitney's position is Sitney, *Visionary Film: The American Avant-Garde, 1943–2000*, 3rd ed. (Oxford and New York: Oxford University Press, 2002), 347–370.

⁷ A nuanced articulation of this position is Paul Arthur, "Structural Film: Revisions, New Versions, and the Artifact," *Millennium Film Journal* 2 (Spring/Summer 1978): 5–13.

⁸ Peter Gidal, "Theory and Definition of Structural/Materialist Film," in *Structural Film Anthology*, ed. Peter Gidal (London: BFI, 1976), 1.

⁹ The phrase "minor cinema" was coined by Tom Gunning in a short but influential article on the post-Structural generation. See Tom Gunning, "Towards a Minor Cinema: Fonoroff, Herwitz, Ahwesh, Lapore, Klahr, and Solomon," *Motion Picture* 3.1–2 (1989–90): 2–5.

¹⁰ Hutton quoted in Scott MacDonald, "Interview with Peter Hutton," in *Adventures of Perception: Cinema as Exploration: Essays/Interviews* (Berkeley, Los Angeles, and London: University of California Press, 2009), 230.

¹¹ *Ibid.*, 215

¹² On the concept of “haptic visuality,” see Laura U. Marks, *Touch: Sensuous Theory and Multisensory Media* (Minneapolis: University of Minnesota Press, 2002).

¹³ The poetic tradition is a more general term for a trend identified by P. Adams Sitney as the “Lyrical Film.” See Sitney, *Visionary Film*, 155–187. The poetic tradition is historicized in James Peterson, *Dreams of Chaos, Visions of Order: Understanding the American Avant-Garde Cinema* (Detroit: Wayne State University Press, 1994), 29–70. Scott MacDonald reads Peter Hutton’s work as specifically related to the “Luminist” tradition of painting in MacDonald, *The Garden in the Machine: A Field Guide to Independent Films about Place* (Berkeley, Los Angeles, and London: University of California Press, 2001), 273–288.

¹⁴ Most film production handbooks provide this basic information. For a contemporaneous survey that would have been used by many avant-garde filmmakers in the 1970s, see Lenny Lipton, *Independent Filmmaking* (San Francisco: Straight Arrow Books, 1972), 52–74.

¹⁵ *Ibid.*, 75–85.

¹⁶ For instance, an early review of Hutton’s work specifically mentions his use of Tri-X. See Jon Jost, “Independents: Image Conscious,” *American Film* 11.3 (December 1, 1985): 72–73.

¹⁷ Peter Hutton, telephone conversation with the author, April 19, 2016.

¹⁸ Hutton recalls this period in Scott MacDonald, “Interview with Peter Hutton,” *A Critical Cinema 3: Interviews with Independent Filmmakers* (Berkeley, Los Angeles, and London: University of California Press, 1998), 250.

¹⁹ Peter Hutton, telephone conversation with the author, April 19, 2016.

²⁰ *Ibid.*

²¹ Hutton quoted in Scott MacDonald, “Interview with Peter Hutton,” *Adventures of Perception*, 224.

²² Peter Hutton, telephone conversation with the author, April 19, 2016.

²³ *Ibid.*

²⁴ Hutton quoted in Scott MacDonald, “Interview with Peter Hutton,” *Adventures of Perception*, 221.

²⁵ *Ibid.*, 224–225.

²⁶ In fact, Hutton did not even A-B roll his films to hide the splice marks until 1997. Peter Hutton, telephone conversation with the author, April 19, 2016.

²⁷ Peter Hutton, telephone conversation with the author, April 19, 2016.

²⁸ Ansel Adams's zone system partitions shades of gray into eleven zones, ranging from black (Zone 0) to white (Zone X). These zones demarcate reflectance values, which assist filmmakers in determining exposure. Zones I, II, and III are the darkest grays.

²⁹ Hutton notes that the filmmaker Jon Rubin, a close friend, attended workshops at the Eastman Kodak plant in Rochester, where he would force process his own work in attempt to increase the amount of grain. According to Hutton, the technicians were aghast, because their time was spent trying to produce faster stocks with less grain. Peter Hutton, telephone conversation with the author, April 19, 2016.

³⁰ Hutton quoted in Scott MacDonald, "Interview with Peter Hutton," *Adventures of Perception*, 217.

³¹ Peter Hutton, telephone conversation with the author, April 19, 2016.

³² For avant-garde film preservationist Mark Toscano's take on the shift from reversal to negative stocks, see Toscano, "Stan Brakhage's Two Negatives," *Preservation Insanity* (blog), February 24, 2012, <http://preservationinsanity.blogspot.com/2012/02/stan-brakhages-two-negatives.html/>.

³³ Henry Hills, telephone conversation with the author, May 6, 2015.

³⁴ Hutton quoted in Scott MacDonald, "Interview with Peter Hutton," *Adventures of Perception*, 218.

³⁵ Nathaniel Dorsky, "Turbidus Film and Fylkingen present Nathaniel Dorsky, Daniel A. Swarthnas and Martin Grennberger in conversation," *nathanieldorsky.net*, December 25, 2015, <http://nathanieldorsky.net/post/135906898318/turbidus-film-and-fylkingen-present-nathaniel/>.

³⁶ Dorsky quoted in David Berridge, "Reconstructing Nathaniel Dorsky," *More Milk Yvette* (blog), October 27, 2008, <http://moremilkyvette.blogspot.com/2008/10/reconstructing-nathaniel-dorsky.html/>.

³⁷ Ibid.

³⁸ Nathaniel Dorsky, program note for *Compline*, Canyon Cinema catalogue, <http://canyoncinema.com/catalog/film/?i=4320/>.

³⁹ Manohla Dargis, "The Revolution Is Being Shot on Digital Video," *New York Times*, December 17, 2010: AR8. In *The Cinema of Poetry*, P. Adams Sitney speculates that Dorsky's preoccupation with the death of Kodachrome was a "displacement of a more acute crisis," namely, the fact that he had exhausted the possibilities of his cinematic form and that his new films "struck many of his viewers as nearly indistinguishable from his previous ones." See Sitney, *The Cinema of Poetry* (Oxford and New York: Oxford University Press, 2015), 205.

⁴⁰ Nathaniel Dorsky, *Devotional Cinema*, 2nd ed. (Berkeley: Tuumba Press, 2005), 18.

⁴¹ Dorsky discusses this aspect of devotional cinema in *Ibid.*, 27–30.

⁴² Nathaniel Dorsky, “Turbidus Film and Fylkingen present Nathaniel Dorsky...”

⁴³ Noël Carroll, “Causation, the Ampliation of Movement and Avant-Garde Film,” in *Theorizing the Moving Image* (Cambridge and New York: Cambridge University Press, 1996), 177. Polyvalent montage builds on Sergei Eisenstein’s concept of overtone montage and can be understood as a form of overtone montage in which the dominant is always shifting. Eisenstein defines overtone montage in Eisenstein, “Methods of Montage,” in *Film Form*, trans. Jay Leyda (San Diego: Harcourt Brace, 1949), 78–81. Also relevant is the distinction between representation and image in Eisenstein, “Word and Image,” in *The Film Sense*, trans. Jay Leyda (San Diego: Harcourt Brace, 1942), 7–36. Dorsky often cites the films of Warren Sonbert and the poetics of John Ashbery as crucial for the development of his own specific deployment of the form.

⁴⁴ Charles Tepperman discusses amateur uses of Kodachrome in Tepperman, *Amateur Cinema: The Rise of North American Moviemaking* (Oakland, CA: University of California Press, 2015), 104–109. For a technological history of Kodachrome, see Alan Kattelle, *Home Movies: A History of the American Industry, 1897–1979* (Nashua, NH: Transition Publishing, 2000), 183–185.

⁴⁵ Tepperman, 105.

⁴⁶ Nathaniel Dorsky, telephone conversation with the author, April 18, 2016.

⁴⁷ Brakhage quoted in Jerry Johnson, “Film at Wit’s End: An Interview with Stan Brakhage,” *The Austin Chronicle*, September 12, 1997, <http://www.austinchronicle.com/screens/1997-09-12/518407/>.

⁴⁸ Andy Grundberg, “Kodachrome Offers a Speedier Film,” *New York Times*, September 14, 1986: 79.

⁴⁹ Lampert quoted in Spencer Morgan, “‘Kodak, Don’t Take My Kodachrome,’” *New York Times*, May 31, 2005: E1.

⁵⁰ Paul Simon, “Kodachrome,” *There Goes Rhymin’ Simon*, 1973, Columbia Records, KC 32280.

⁵¹ Dorsky quoted in Max Goldberg, “The Inmost Leaf: An Interview with Nathaniel Dorsky,” *cinema scope* 46 (Spring 2011), <http://cinema-scope.com/cinema-scope-magazine/interviews-the-inmost-leaf-an-interview-with-nathaniel-dorsky/>.

⁵² Nathaniel Dorsky, telephone conversation with the author, April 18, 2016.

⁵³ Dorsky quoted in Michael Guillen, “Nathaniel Dorsky On...” *twitch*, August 30, 2009, <http://twitchfilm.com/2009/08/nathaniel-dorsky-on.html>.

⁵⁴ Dorsky quoted in Kenneth Baker, “Dorsky’s Silent Vulnerability Makes Noise,” *SFGate*, February 21, 2010, <http://www.sfgate.com/entertainment/article/Dorsky-s-silent-vulnerability-makes-noise-3199303.php/>.

⁵⁵ Nathaniel Dorsky, program note for “The Illuminations of Nathaniel Dorsky,” Harvard Film Archive, March 29, 2013, <http://hcl.harvard.edu/hfa/films/2013aprjun/dorsky.html/>.

⁵⁶ According to Dorsky, the stock’s designation as ASA 64 was likely incorrect, as *The Return* was much darker than he anticipated. For his next film, *August and After* (2012), partially shot with the same Fuji negative, he consistently opened his aperture an additional stop. Nathaniel Dorsky, telephone conversation with the author, April 18, 2016.

⁵⁷ Michael Sicinski, “Basso Profondo: Nathaniel Dorsky’s ‘The Return,’” *Mubi* (blog), September 23, 2011, <https://mubi.com/notebook/posts/basso-profondo-nathaniel-dorskys-the-return/>.

⁵⁸ Nathaniel Dorsky, telephone conversation with the author, April 18, 2016.

⁵⁹ Nathaniel Dorsky, “Turbidus Film and Fylkingen present Nathaniel Dorsky.”

⁶⁰ As with the rest of this dissertation, this chapter is limited to American filmmakers. It should be noted that European artists, especially the German filmmaking collective Schmelzdahin (comprised of filmmakers Jochen Lempert, Jochen Müller, and Jürgen Reble) began experimenting with similar processes in the 1980s. See Jürgen Reble, “Chemistry and the Alchemy of Colour,” *Millennium Film Journal* 30–31 (Fall 1997): 13–17.

⁶¹ The basics of film stocks, emulsion, and processing are discussed in Kris Malkiewicz, *Cinematography*, revised ed. (New York: Van Nostrand Reinhold Company, 1973), 59–71, and Lenny Lipton, *Independent Filmmaking*, 51–87.

⁶² Paolo Cherchi Usai, *The Death of Cinema: History, Cultural Memory and the Digital Dark Age* (London: BFI, 2001), 39–41.

⁶³ Conrad quoted in Jay Sanders, “Tony Conrad,” *BOMB* 92 (Summer 2005): 69, <http://bombmagazine.org/article/2752/tony-conrad/>.

⁶⁴ Philip Solomon, “Why I am drawn to using Found Footage,” in *Found Footage Film*, eds. Cecilia Hausheer and Christoph Settele (Luzern: VIPER/zyklog verlog, 1992), 131.

⁶⁵ Jennifer Reeves, program note for *Landfill 16*, http://www.jenniferreevesfilm.com/pages/artpage_1.php?page=1/.

⁶⁶ Adrian Searle, "Joseph Beuys: The Antidote to Beauty," *The Guardian*, February 3, 2005, <http://www.theguardian.com/culture/2005/feb/03/1/>.

⁶⁷ See National Film Preservation Foundation, *The Film Preservation Guide: The Basics for Archives, Libraries, and Museums* (San Francisco: National Film Preservation Foundation, 2004), 13–17. The most famous film to aestheticize these naturally occurring processes is Bill Morrison's *Decasia* (2002).

⁶⁸ William C. Wees, *Recycled Images: The Art and Politics of Found Footage Films* (New York: Anthology Film Archives, 1993), 42.

⁶⁹ Standish D. Lawder, "Comments on the Collage Film," in *Found Footage Film*, 113, 115.

⁷⁰ Wees, 4. Similarly, James Peterson argues that forging overall coherence from a selection of seemingly dissimilar clips is central to the process of how viewers make sense of what he terms "assemblage films" in Peterson, *Dreams of Chaos, Visions of Order: Understanding the American Avant-Garde Cinema* (Detroit: Wayne State University Press, 1994), 145–178.

⁷¹ See André Bazin, "The Ontology of the Photographic Image," in *What Is Cinema?*, trans. Hugh Gray (Berkeley and Los Angeles: University of California Press, 1967), 9–16.

⁷² See Jean-Louis Baudry, "Ideological Effects of the Basic Cinematographic Apparatus" in *Narrative, Apparatus, Ideology: A Film Theory Reader*, ed. Philip Rosen (New York and Chichester: Columbia University Press, 1986), 286–298, and Jean-Louis Comolli, "Technique and Ideology: Camera, Perspective, Depth of Field" in *Narrative, Apparatus, Ideology*, 421–443.

⁷³ Baudry, 291.

⁷⁴ Gatten quoted in Scott MacDonald, "Interview with David Gatten," in *Adventures of Perception*, 307.

⁷⁵ Although there are six films in the series, each film consists of three separate attempts at the experiment, each conducted over the course of three days. Therefore, the process was repeated 18 times. The first three films (made in 1997–98) are distributed on a single reel, as are the final four (made in 2006–07). The breakdown is as follows: *No. 1* (1/10/97, 1/11/97, 1/12/97), *No. 2* (10/13/97, 10/14/97, 10/16/97), *No. 3* (8/22/98 x 3), *No. 4* (1/10/06, 1/11/06, 1/12/06), *No. 5* (8/11/06, 8/12/06, 8/14/06), *No. 6* (12/29/06, 12/30/06, 12/31/06).

⁷⁶ Scott MacDonald provides a great deal of factual information, as well as rigorous formal analysis, of the first three films in the series in MacDonald, *The Garden in the Machine*, 373–74.

⁷⁷ David Gatten, in conversation with the author, March 11, 2011.

⁷⁸ Jennifer Reeves, telephone conversation with the author, May 4, 2014. Most of the details about the films' production are culled from this conversation.

⁷⁹ This practice is detailed in Jonathan Metzl, “‘Mother’s Little Helper’: The Crisis of Psychoanalysis and the Miltown Resolution,” *Gender & History* 15.2 (August 2003): 240–267.

⁸⁰ Naomi Uman, e-mail conversation with the author, April 29, 2014. All quotes from Uman and general information regarding the making of *Removed* are from this exchange.

⁸¹ Ahwesh quoted in Scott MacDonald, “Interview with Peggy Ahwesh,” *A Critical Cinema 5: Interviews with Independent Filmmakers* (Berkeley, Los Angeles, and London: University of California Press, 2006), 135.

⁸² Ahwesh quoted in Elena Gorfinkel, “Arousal in Ruins: *The Color of Love* and the Haptic Object of Film History,” *World Picture Journal* 4 (April 2010): 5.

⁸³ Ahwesh quoted in MacDonald, “Interview with Peggy Ahwesh,” 135.

⁸⁴ The Piazzolla compositions that Ahwesh uses are “Biyuya,” “Marejadilla,” and “Escualo,” all of which come from Piazzolla’s album, *Biyuya* (1980).

⁸⁵ Gavin Smith, “The Way of All Flesh,” *Film Comment* 31.4 (July 1995): 18. See also Gorfinkel, “Arousal in Ruins.”

⁸⁶ Solomon quoted in Scott MacDonald, “Interview with Phil Solomon,” *A Critical Cinema* 5, 215.

⁸⁷ See Susanne Langer, *Feeling and Form: A Theory of Art* (New York: Scribner, 1953).

⁸⁸ In addition to the cited interviews, all of the quotes and background information pertaining to the films, both in terms of technique and meaning, is from Phil Solomon, telephone conversation with the author, May 31, 2014.

⁸⁹ Solomon quoted in MacDonald, “Interview with Phil Solomon,” 214–215.

⁹⁰ Solomon quoted in Brian Price and Megan Sutherland, “Mediating the American Idea: A Conversation with Phil Solomon,” *World Picture Journal* 7 (Autumn 2012): 5.

⁹¹ For a detailed, shot-by-shot explication of *Clepsydra*, see Phil Solomon, “The Frame,” *Millennium Film Journal* 35–36 (Fall 2000): 121–135.

⁹² *Ibid.*, 123.

⁹³ These darker portions of “*Walking Distance*” resulted from Solomon using his fingers to block the light on the optical printer.

⁹⁴ All of the background information on “*Walking Distance*” comes from my own conversation with Solomon, as well as MacDonald, “Interview with Phil Solomon,” 221–223.

⁹⁵ In this case, I am referring specifically to the films that use chemical treatments. As I discuss in Chapter Four, Solomon's elegiac digital quartet, *In Memoriam* (Mark LaPore) (2005–09) is deeply personal. See also John Powers, "Darkness on the Edge of Town: Film Meets Video in Phil Solomon's *In Memoriam* (Mark LaPore)," *October* 137 (Summer 2011): 85–106.

⁹⁶ Solomon quoted in Price and Sutherland: 6.

⁹⁷ Luther Price, telephone conversation with the author, February 5, 2014.

⁹⁸ Halter quoted in Thomas Morgan Evans, "Q&A with Ed Halter: The Films of Luther Price," *LUX/ICA Journal*, May 25, 2012, <http://biennialofmovingimages.org.uk/2012-biennial/journal/qa-with-ed-halter-the-films-of-luther-price/>.

⁹⁹ Andrew Lampert, "Luther Price," *BOMB* 120 (Summer 2012): 114.

¹⁰⁰ Price quoted in Aaron Cutler and Mariana Shellard, "The hand made Luther Price," *Idiom*, October 5, 2012, <http://idiommag.com/2012/10/the-handmade-luther-price/>. Price's distinctive written style of communication is an extension of his artistic practice, so his punctuation and syntax has been left intact.

¹⁰¹ Ibid.

¹⁰² Schneemann quoted in Kate Haug, "An Interview with Carolee Schneemann," *Wide Angle* 20.1 (1998): 38.

¹⁰³ Price provides a fairly detailed account of this event in Allison Meier, "20... Or So Questions for Idiosyncratic Filmmaker Luther Price," *Blouin ArtInfo*, January 22, 2013, <http://www.callicoonfinearts.com/site/assets/files/3630/lutherpriceartinfo.pdf/>.

¹⁰⁴ For information about the Tom Rhoads films, see *Tom Rhoads: Three Films*, ed. Bradford Nordeen (New York: Dirty Looks at The Kitchen, 2013).

¹⁰⁵ Although details of Price's life and filmography are sometimes conflicting, the two most detailed sources are Lia Gangitano, *Luther Price: Imitation of Life* (New York: Thread Waxing Space, 1998); and Bradford Nordeen, *Luther Price: Fancy Days, Fancy Times* (New York: Dirty Looks, 2011).

¹⁰⁶ For instance, see Thomas Morgan Evans, "Q&A with Ed Halter."

¹⁰⁷ Price was frequently attacked for his violent depiction of gay sex in *Sodom*. For a defense of the film, see Michael Wallin, "In Defense of *Sodom*: A Gut Response," *Cinematograph* 4 (1991): 145–148.

¹⁰⁸ Luther Price, telephone conversation with the author, February 5, 2014. Price would return to *Meat* later in the decade, rephotographing portions of the VHS off a television set for *Meat (dry 02)*, *Meat (blue 03)*, and *Meat (situation 04)* (1997–99).

¹⁰⁹ Luther Price, “Rare Super-8 Films and Handmade Slides by Luther Price” (post-screening discussion, The Nightingale, Chicago, IL, March 31, 2013).

¹¹⁰ Price quoted in Aaron Cutler and Mariana Shellard, “The hand made Luther Price.”

¹¹¹ See Luther Price, “A Consumption in Time,” *transmediale/festival*, February 2, 2014, <http://www.transmediale.de/content/a-consumption-in-time/>.

¹¹² Halter quoted in Thomas Morgan Evans, “Q&A with Ed Halter.” Anecdotally, I can confirm Halter’s account. When I organized the first complete screening of Price’s *Biscuits/Biscotts* series in 2013, I was surprised to discover upon receiving the films that Price had included at least two films that were not in any extant filmographies and had never been screened, although they had been made years earlier.

¹¹³ Luther Price, “A Consumption in Time.”

Chapter Two The Fourth Watch: The Film Laboratory

When the original of *Fireworks* (1947) had shrunk too much to make any more prints, and a lab in New York had clumsily ripped the sprocket holes on the originals of *Scorpio Rising* (1963) and *Kustom Kar Kommandos* (1965), Kenneth Anger wrote to Stan Brakhage: “I envy the special relationship you have with your lab, so arduously built up over the years. I haven’t ever found one where such an arrangement is even remotely possible. A lab of one’s own? I suppose that’s the only ultimate for the COMPLEAT filmmaker.”¹ Anger’s wish affirms the lab’s role in the filmmaking process, advancing the idea that filmmaker and lab are bound in a relationship that requires communication and exchange. Like all filmmakers, avant-garde artists need to have footage processed, workprints and answer prints prepared, films timed, color corrected, and broken into multiple rolls for fades, dissolves, and superimpositions. These procedures are so ubiquitous that they are usually dismissed as non-creative technical drudgery. In fact, these basic components of 16mm filmmaking provided both obstacles to be overcome and opportunities for visual transformation and action-based working processes. As sites of creative negotiation, the avant-garde’s relationship with film labs was characterized by reciprocity, dependency, innovation, and sometimes hostility.

Despite the fact that a lab of one’s own is the “only ultimate” for the filmmaker, there is virtually no discussion of this relationship in writing on avant-garde cinema.² The lab’s role in influencing avant-garde aesthetics raises a host of questions: What were the most common lab services requested by avant-garde filmmakers, and would they have been considered unorthodox? Were working relationships between avant-garde filmmakers and labs friendly or combative? What were some of the specific challenges for avant-garde filmmakers in working

with labs, and vice versa? How did labs affect artists' working processes, especially in terms of their interest in film's materiality? To what extent, if any, did artists collaborate with labs? How could labs be considered the nexus of the avant-garde's imbrication within other 16mm-based filmmaking modes? And how do labs inform longstanding discursive debates in the history of the avant-garde, such as individualism vs. collaboration, amateurism vs. professionalism, and the auratic vs. the reproduced?

First, however, it is necessary to summarize the typical lab experience to provide a blueprint for the process, establish basic terminology, and highlight the lab's influence in the visual aesthetics of the finished film. After shooting a film on negative or reversal stock and dropping it off at the lab, technicians would process the film and return it to the filmmaker, usually within a day or two. If requested, a timed or untimed workprint would be made and returned with the original rolls. Most commonly, the filmmaker would edit the workprint (or, in some cases, reversal original), prepare the soundtrack, and plan for any multiple-roll printing. A preferred cut in hand, the filmmaker would bring the film back to the lab. If this was in the form of a workprint, either the filmmaker, lab technician, or negative cutter would conform the original. The lab would then use the original to make an answer print, a print of the film that has been timed with all of the effects added. This is prepared on a contact printer with the timer selecting proper exposure for each shot of the film, and—if the filmmaker shot color stock—correcting color values. The filmmaker may tweak the densities and colors over the course of multiple answer prints before getting them exactly right. The lab would then strike release prints from the original or from intermediate prints made to avoid wear and tear.³

Of course, there are dozens of variations within this schema, some of which were historically contingent (the choice of film stock, timing methods), and others of which depended

upon the filmmaker's preferences (making a workprint, number of answer prints). But despite these deviations, this basic set of procedures conditioned the kinds of films that could be made. This is not to say that the technology determined the films, but to argue that it constituted a system of constraints within which artists could feel restricted or empowered. Many of the films discussed in this chapter could be viewed as collaborations between a delimited medium and an artist determined to explore its boundaries. This stands in contrast to conventional thinking about the avant-garde, which emphasizes the absolute freedom of the creator, independence from all forms of commercial cinema, and total control over all elements of film production.⁴

Some films, however, are inseparable from these technologically based contingencies. For instance, Lewis Klahr's *Engram Sepals* (2000) is a "Buddhist noir" involving adultery and corporate espionage as dramatized through 1950s-era etchings and magazine cutouts. Because the film was to be a noir murder mystery, Klahr wanted to shoot on black-and-white reversal. Although he had not used the stock much in his previous work, the added silver content brought with it the potential for sumptuous images packed with detail. And *Engram Sepals* is an elegantly designed film, composed with nuance and refinement, and full of slight gradations of emphasis. But when Klahr brought the film to the lab, he discovered that his images were so intricate that the timer would have to privilege certain details at the expense of others. According to Klahr:

There was no way to make a print that was going to do justice to everything that was on that original reversal; it was kind of like, they could pick Column A or Column B. I was a little uncomfortable because I wasn't picking what to focus on, the timer was picking. You'll see this or you'll see that. And the timer did a good job of selecting what he felt was important to those images. But when I got it back, I knew what I wasn't seeing, so I had to watch it a few times before I adjusted. They were beautiful prints, but I was kind of amazed that the stock couldn't reproduce the detail that was there.⁵

Viewing *Engram Sepals*, one can easily discern Klahr's singular fusion of cutout animation,

oblique narrative, and American material culture. Nonetheless, the content of the film, mode of production, particularities of film stock, and lab capabilities formed a set of interrelated constraints and possibilities that informed Klahr's working process and his results. Surprisingly, Klahr had to cede control of a major aesthetic parameter—point of focus—to a lab technician. Fortunately, he was happy with the finished product, but Klahr maintains that, given the right exhibition context, he would still prefer to show his camera original.

Klahr's example also serves to illustrate the degree to which labs should be considered part of the "art world" of avant-garde filmmaking. In *Art Worlds*, his sociological study of art, Howard Becker observes that all art works depend upon a large number of people, each with his or her own specific tasks to perform. Members of an art world play different roles within the ecosystem, but Becker includes the laborers who make the materials, hang the paintings, and sponsor the artists as crucial to its functioning.⁶ By definition, filmmakers are engaged in a technological medium, and even the avant-garde relies upon a network of facilitators to bring its work into existence. As a form of artistic labor, the labs qualify as important nodes in the art world of the avant-garde. Furthermore, the relationships between labs and filmmakers reveal that the avant-garde was imbricated within a network that also included amateur filmmaking, journalism, pornography, sports broadcasting, and a wide array of services ancillary to the industry. Therefore, an examination of film labs broadens the recent "institutional turn" in avant-garde film scholarship by exploring the ways in which filmmakers learned to adapt to a system outside of their control to realize the films that they imagined.

Film labs also help to clarify a longstanding discursive and aesthetic debate within the avant-garde between amateurism and professionalism. For the immediate postwar avant-garde, labs were often sites of contention; many filmmakers suspected that lab technicians were simply

punching a clock, while the technicians resented the filmmakers' unawareness of "correct" filmmaking protocols. Subsequent generations, however, were open to the idea that labs could be sites of collaboration between artistic laborers. In this chapter, I argue that avant-garde filmmakers consistently strived for technical expertise, often engaging the lab in the filmmaking process and demonstrating a careful awareness of filmmaking procedure, even when breaking the rules. Despite its reputation for unorthodoxy, the lab reveals the technological sophistication at the heart of the avant-garde filmmaking enterprise. Moreover, the fact that avant-garde filmmakers are responsible for most aspects of their films puts them in close contact with the lab process, which makes their films ideal case studies for the influence of labs on filmmaking aesthetics more generally.

A crucial similarity between working with the 16mm filmstrip, the film lab, or the optical printer was that these technologies constituted a post-production, process-based approach to filmmaking. Tellingly, Janie Geiser includes dropping off and picking up film, preparing A-and-B rolls, and sitting with the timer as part of her filmmaking routine, an aspect of the process that she could depend upon and anticipate.⁷ As will be discussed, filmmakers often considered lab work during the production phase, absorbing processing and timing into the more "creative" work of shooting and editing and devoting hours to preparing elaborate timing sheets or conforming their negative. Once printed, the film simply became the film, and the process that constituted its making was eclipsed by the definitiveness of its material existence.

In this chapter, I recover this process and reassert its importance. In the first section, I provide a brief overview of the commercial film laboratory, a history that has been surprisingly neglected in film and media studies. The second and third sections examine relationships between labs and avant-garde filmmakers and the role of the lab in shaping avant-garde

aesthetics, respectively. The fourth section explores the unlikely convergence between the avant-garde and pornography in film labs, demonstrating the degree to which the avant-garde was imbricated within other 16mm modes of filmmaking. The next section investigates the collaborative working relationship between Stan Brakhage and his lab, Western Cine. Finally, I discuss two films, Morgan Fisher's *Cue Rolls* (1974) and J.J. Murphy's *Print Generation* (1973–74), that make lab processes their subjects.

A Brief History of the Commercial Film Laboratory

Although virtually every artist discussed in this dissertation has extensive experience with labs, the avant-garde plays only a supporting role in the larger history of the commercial film laboratory. Despite their marginal position within the system, avant-garde filmmakers differed from their Hollywood counterparts in that they worked directly with the labs without mediation. Therefore, they make uniquely revealing case studies for understanding the decisive effects that labs had on filmmaking aesthetics. In addition, their interactions with labs are imbricated within commercial, industrial, semi-professional, and amateur filmmaking practices, and overlap with other off-Hollywood, 16mm-based industries, such as television, journalism, and pornography. Although it is beyond the scope of this chapter to provide an exhaustive history of film labs, a basic account is necessary to contextualize the role of the avant-garde filmmaker within an industry that existed mainly to serve commercial interests.

In the classical era, the Hollywood studios had their own labs, run by strong personalities whose careers began in the early days of the motion picture business. Although hardly household names, lab technicians John Nickolaus (MGM), Fred Gage (Warner Bros.), James R. Wilkinson (Paramount), and C. Roy Hunter (Universal) worked closely with their cinematography

departments to develop their studios' "house styles."⁸ Their labs were responsible for all production-related duties, including developing the negative, printing the dailies, preparing the soundtrack, cutting the negative, and timing the answer prints. Bulk release printing, however, was farmed out to commercial labs on the East Coast, and so the earliest film labs went into business mainly to cater to the studios. New York-based labs such as DuArt (who contracted with Paramount and Universal) and Ace Film Laboratories (Warner Bros.) supplemented their studio contracts with smaller jobs, such as fast-turnaround boxing matches.⁹ Other labs bolstered their business with special contracts or proprietary systems. For instance, Hollywood Film Enterprises had a lucrative contract with Disney to reduce their cartoons to 8mm and 16mm for home use, while Technicolor, Inc. boasted their innovative color process.¹⁰

Other labs took advantage of the period identified by Patricia Zimmermann and Charles Tepperman as the first wave of amateur and industrial film culture, initiated by Eastman Kodak's introduction of 16mm reversal film stock in 1923.¹¹ Once Kodak and Bell & Howell solidified their status as the dominant manufacturing forces, predominantly regional labs, which often doubled as production companies, sprang into business to service the non-Hollywood 16mm market. For example, Calvin Productions (Kansas City and Philadelphia, 1916 and 1931) specialized in industrial and educational films, Filmack Studios (Chicago, 1919) mostly produced trailers, and the Jamieson Film Company (Dallas, 1916) developed a reputation for regional advertising, commercials, and newsreels.¹² Even labs that primarily catered to the 35mm studio business, such as Filmlab, Inc. (New York, 1924), installed optical reduction printers to reduce standard negative to 16mm, a direct response to the increasing demand for film by amateur moviemakers.¹³

For the most part, however, individuals simply did not have much use for film labs. When

a filmmaker bought a roll of 16mm film, Kodak included the cost of processing in the purchase price. After exposing the film, the maker mailed the roll to one of Eastman Kodak's processing stations, the largest of which was located in Rochester, New York. The roll would travel through a series of processing rooms, where it was numbered, spliced end-to-end with other films to be processed, sent through the machine, separated and wound onto a return reel, and mailed back to the customer. This was standard procedure for all types of film stock, but it was absolutely necessary for Kodachrome (the most widely used 16mm color film), which was notoriously complicated to process.¹⁴ Kodak's monopolistic control of both manufacturing and processing meant that amateurs could shoot reversal stock and receive a projectable positive print without interacting with a physical lab. Although some of the advanced amateurs who submitted their films to contests and were active in the Amateur Cinema League made duplicate prints, working directly with a technician to generate workprints, answer prints, and release prints was rare.¹⁵

By the 1960s, the lab business had changed dramatically. A long-ranging effect of the 1948 Paramount Decision, which broke up the oligopic structure of the classical studio system, was the siphoning of the bulk release print business from New York to Los Angeles. With the studios contracting almost exclusively to labs in their own backyard, the New York lab business dwindled from 3,500 unionized technicians to only 365.¹⁶ Ironically, this shrinking number of technicians found employment in a rapidly proliferating assortment of smaller labs that sprang up in the 1950s and 1960s to service several important new markets.

Chief among these new markets was television, which also encompassed the rapidly expanding fields of journalism and sports broadcasting. Especially significant were the burgeoning nightly news broadcasts, which demanded fast turnaround times for shooting, processing, and editing. Based upon the reminiscences of Henry Cassirer, an important player in

the development of network news at CBS, television historian Mike Conway has argued that the immediacy of locally filmed news events and feature stories became a “selling point of television as a news medium” after World War II. Cameramen were encouraged to rush to the scene of an unfolding event, take some footage, process it at a lab in the afternoon, and have it on the air by the evening. According to Conway, “the speed of shooting, processing, and presenting film became a television news bragging point, much like a newspaper scoop.”¹⁷ From the lab’s point of view, this guaranteed a steady stream of business in 16mm reversal, the stocks used by news reporters. Marvin Soloway, the owner of the New York-based Cinelab, recalled: “Color reversal was used for news because they could cut it immediately and put it on the air. So they used to bring us what were called ‘onion skin bags’ of film with stuff they were shooting all over the city, we’d process it, and within an hour, they’d throw it on Steenbecks and cut it and put it on television.”¹⁸

Another catalyst for the booming postwar lab business was an antitrust suit and consent decree issued in 1954 that forced Kodak to separate its processing business from its color film sales. At the time, Kodak had over 90% of the color film market; by including the cost of processing in the sale of film stock, they effectively dominated the processing market, as well.¹⁹ Therefore, it was determined by District Judge John Knight that Kodak could no longer sell “its color film on any basis which includes any charge for the processing of said film or any agreement to process such film.”²⁰ Furthermore, the consent decree ordered Kodak to supply equipment and chemicals to any applicant wishing to process Kodak film, as well as a written manual describing methods of processing and providing specific chemical formulas. Of course, this stipulation ensured that Kodak retained its enviable position of market dominance, as they quickly introduced a new line of less complicated processing and printing equipment to supply to

independent lab owners.²¹ Particularly significant was the introduction of Ektachrome, a color reversal alternative to Kodachrome that was much easier to process in smaller labs.

In this increasingly competitive environment, labs were faced with a constantly evolving marketplace, and the next three decades witnessed a proliferation of new products and processes, along with expensive equipment designed to facilitate them. Older film stocks were refined and newer, faster stocks were introduced. Super-8 and videotape were established as viable markets, effectively diminishing the color reversal business. The Hazeltine Color Analyzer allowed for color correction and timing on a TV monitor before prints were made. Labs attracted customers with the lure of overnight processing. Awareness of film preservation and restoration was boosted by the advent of wet-gate printing. Business in color negative increased in the 1970s and 1980s, which gave labs a reason to keep negative cutters on staff. Further innovations in computerized control of processing, timing, and color correction put pressure on lab owners to gain an edge on competitors by investing in the latest development.

Consequently, the period from 1950 to 1970 was one of rapid growth and quick decline for commercial film labs in the United States, especially in regional markets. Even in Manhattan, old warhorses such as DuArt, Movielab, De Luxe Film Laboratories, and Kin-o-lux were joined by young upstarts, including Bebell & Bebell, VPI Services, Tri-Film Service, Manhattan Color Laboratory, Criterion Film Labs (name changed from Circle Film Labs), Guffanti Film Laboratories, Filmtronics, Precision Film Laboratories, Lab-TV, Video Film Laboratories, Cinelab, A1 Reverse-o-lab, Huemark Films, J&D Laboratories, Media Film Services, and TVC Laboratories. Such fierce competition resulted in differentiation among the services provided. Some labs only processed black-and-white reversal, while others specialized in color negative or Super-8. “Wet labs” could process and print film, but “dry labs” had only printing machines,

which usually meant that they would not store a filmmaker's originals. There were also substantial differences between doing business with a more established lab or using one that was decidedly more fly-by-night. In a 1971 survey of lab owners from all parts of the country, there emerged general consensus that the biggest challenge for labs was introducing cost-cutting measures without sacrificing quality, a state of affairs directly linked to heavy competition and the constant influx of new technologies.²²

This flurry of activity inspired a fresh wave of interest in film labs among amateur filmmakers. In 1953, *Movie Makers*, the official magazine of the Amateur Cinema League, published an article entitled "Look to Your Laboratory." The author observes that amateur filmmakers traditionally held little interest in labs, content to send their films to Kodak processing stations and live with the results. Lately, however, the ACL has received "an increasing stream of inquiries concerning such new-old mysteries as the meaning of 'negative,' 'positive,' 'duplicate,' 'dupe negative,' 'timed print' and the like."²³ The article then explains basic lab operations, emphasizing timing (which the author notes has become standard practice), enlargement and reduction, making prints, and inspecting for print quality. Beyond the informational content, the procedures that the article highlights suggest that some amateurs were becoming more ambitious in terms of both technique and their expectations for their films after they were finished. This is reinforced by an article in the following issue describing the procedure for A and B rolling, in which the author encourages his readers to consider using the lab for making dissolves instead of executing them in camera for a more professional look.²⁴

"Look to Your Laboratory" concludes with advice to filmmakers on preparing their films for the lab. This emphasis on interaction underscores the developing financial and artistic relationship between filmmakers and lab technicians. No longer was it necessary for the

transaction to be as anonymous as dropping a roll of film in the mail and waiting expectantly for its return. What had been a relationship of anonymity and resignation was rapidly transforming into one of communication and negotiation. But in an industry that made the bulk of its profits serving commercial clients like movie studios and television stations, individual filmmakers were still fairly marginal entities. How did avant-garde filmmakers, the labs' most artistically ambitious clients, navigate this system? Were their dealings with labs typical or unique, and how did they change over time? And what broader discourses in avant-garde film history are thrown into relief by the complicated relationships between filmmakers and labs?

The Avant-Garde Filmmaker in the Lab

In 1976, *Filmmaker's Newsletter* published an interview with Ralph Teitelbaum, the president of Huemark Films, a Super-8 lab in New York. In the preface, the author noted: "Perhaps the most overworked cliché about filmmaking is that finding a good lab is like getting married. And, unfortunately, there's a bit of truth to it. Labs and filmmakers are mutually dependent to an extraordinary degree; at the same time they often seem to have mutually exclusive concerns and, in fact, to speak different languages. If Thurber hadn't been half-blind, we might easily have had 'The Battle of the Sexes' couched in terms of our craft."²⁵ Tellingly, the reference to Thurber suggests that while major corporations may have driven the financial side of the business, it was personal relationships that defined the lab experience. And, as in Thurber's play, communication and mutual understanding were the qualities that made for a satisfying marriage.

In the case of avant-garde filmmakers, the marriage was a slightly unequal one, if only because their financial contributions to the relationship were negligible. Labs made most of their

money on release printing. The answer printing process, which involved preparing the A and B rolls, timing the print, and synching the soundtrack, was labor intensive and time consuming, but once the work had been performed, running off prints was pure profit, especially if multiple prints were ordered at once. But avant-garde filmmakers typically did not need large numbers of prints. For instance, Janie Geiser and Lewis Klahr, successful filmmakers by most standards, usually ordered between one and three prints of a new film; even Klahr's most popular titles, such as *The Pharaoh's Belt* (1993) and *Altair* (1994), only generated five or six prints in their initial runs.²⁶ This was compounded by the fact that avant-garde films were often short and labor intensive, so while labs were appreciative of the business, their work was never a major source of income. Marvin Soloway, who had many avant-garde filmmakers as customers at Cinelab, remarked that he worked with artists "purely because I liked them. Financially it was not a phenomenal endeavor, especially because I gave away a lot of stuff to them."²⁷

This financial disparity sometimes put avant-garde filmmakers in a peculiar position. Some filmmakers simply saw themselves as any other client. Morgan Fisher explained, "I didn't feel it was reasonable to expect [the lab] to take an interest in the work I was bringing to them, that is, to take any greater interest in my work than in the work of any other customer. I was simply one customer among many." Henry Hills, on the other hand, was cognizant of the fact that he was marginal, especially to the bigger labs: "Going to the labs was always strange, even if they were receptive to what you were doing. They were there to service the film industry, which was supporting all this stuff, so it was an odd relationship." In other spheres, such as distribution, exhibition, and criticism, avant-garde filmmakers were forced to build their own infrastructure that operated independently of the commercial film industry. In the case of labs, however, filmmakers were dependent upon a service that remained largely in the hands of technicians and

businessmen who were not necessarily fluent in avant-garde practice.²⁸

The labs' general unawareness of avant-garde filmmaking strategies, combined with the filmmakers' occasional ignorance of lab procedure, could be a major stumbling block. For that reason, many filmmakers felt that it was imperative to become familiar with the lab process. Hollis Frampton, who worked in a lab processing still photography, advised his students at SUNY Buffalo to wrap their most unconventional films in the most conventional packages, using meticulous lab prep to ensure that there could be no mistake, no matter how little their work resembled a "film" in the sense that a lab tech might understand the term.²⁹ Many of his students followed this advice. Keith Sanborn, for instance, paid close attention to the rules: "Mostly I submitted A-B rolls with all the proper leaders on it, the right kind of emulsion leader on the end, the right kind of neutral density leader, all the standard stuff, so if they fucked it up, I could come and say, 'You fucked it up! This was a really easy job!'" Peter Hutton, who studied at the San Francisco Art Institute, also felt that learning about labs was essential to obtaining a desired result: "Artists just don't understand the practical side of lab work. [Artists] have to give [the lab] a certain amount of information for them to realize that you know what you're doing. In the experimental world, people are often flying by the seat of their pants and don't know how to approach a lab."

An aid to communication was a virtual cottage industry of specialty publications aimed at clarifying lab procedures—in the words of one writer, "to clear up all sorts of mysteries for people who are learning about filmmaking and trying to understand what goes on when the film is out of their hands."³⁰ Some labs reached out to potential clients in periodicals such as *Filmmakers Newsletter*, while others had their own bulletins, the most notable of which was *Alpha Viewfinder*, a publication of the Seattle-based lab, Alpha Cine. Typical articles included

“How to Place an Order with the Laboratory,” “A&B Roll Editing,” and “Titles and the Lab.”³¹

Additionally, filmmaking manuals began to include substantial chapters on dealing with labs.

Lenny Lipton, whose seminal *Independent Filmmaking* is discussed in the next chapter, provides extensive information about what labs do, how they do it, and where independent filmmakers fit within this system.

Lipton tended to take an adversarial role in dealing with labs, peppering his chapter with observations like: “you’re merely asking for trouble when depending on the ordinary lab’s skill at color correction,” “never expect a lab to be able to deliver prints when they say they can,” and “if you have to, get an attorney.”³² Two articles published in *Filmmakers Newsletter* are illustrative in comparing how filmmakers and labs viewed each other. In “The Laboratory and the Filmmaker,” Bob Crawford, a filmmaker who worked in a commercial lab in New York, adopted a point-of-view similar to Lipton’s, excoriating the labs for their unreliability, sloppy work, and tendency to damage prints and deny all blame. After observing that finding a good lab is “more difficult than breathing clean air in New York City,” Crawford proceeds to outline a hypothetical scenario in which a filmmaker waits for the lab to deliver his answer print. It is common, Crawford implies, for the filmmaker to deal with technicians who misplace the footage, run the machines while drunk, don’t get enough sleep to function properly, are in the process of getting divorced, and forget to clean the processing tanks, resulting in a film with terrible scratches, strange blobs, green skin tones, and a “funny weaving from side to side.”³³

A more temperate view was held by John Newell, the president of Western Cine, a Denver-based lab that worked with Stan Brakhage, Gregory Markopoulos, Bruce Baillie, Peter Kubelka, and Ken Jacobs, among others. In “The Lab Customer Defined,” Newell supplied an open letter to filmmakers offering a candid assessment of how they are viewed by their lab. Some of the

qualities that Newell attributes to the lab customer seem especially pertinent for the avant-garde:

He is quality-oriented both because he must compete on a quality level and because he is artistic by nature.

He is a vocal communicator. He tells others when you are good—and when you are bad.

He looks at “value” *not* in terms of price but in terms of the emotional involvement we can give him. “Expertise in service” is the value he is looking for.

He is a creature of habit. He wants to follow a standard procedure (his own) and talk to the same people, in the same order, at the same rate of speed.

He rarely changes vocation, preferring to starve in his chosen field rather than reap higher financial rewards in other fields.³⁴

Newell’s article is pitched to filmmakers, which makes it easy to read as a memorandum to artists that labs consider them to be stubborn and slightly eccentric. But read as an internal set of guidelines for an employer to give his staff, Newell’s list seems complimentary, an acknowledgment that artists can be difficult customers because they have an enormous investment in their films, and that a film viewed by a lab tech as “just another job” might actually be someone’s life’s work. Regardless of point-of-view, both articles contend that artists and labs not only had different goals and knowledge sets, but operated from two fundamentally different states of mind.

Among avant-garde filmmakers, this position was more widely held by the first postwar generation, who were waged in a nearly constant battle to validate experimental filmmaking as an art form. The problem was that lab technicians were not artists, but hourly employees with little regard for film as a serious artistic endeavor. This position was articulated most forcefully in print by Gregory Markopoulos, who had struggled fiercely with labs:

The laboratory technician working by the clock and eager to go home at six in the evening, and what is more, accustomed to the procedures and techniques of the 35mm. servicing and to the more ordinary needs of that incredibly poor medium of the 16mm. documentary film used for telo-educational purposes, does not understand, nor will take the time to understand, the needs of the 16mm. independent film-maker.³⁵

For Markopoulos, the consequence of privileging feature films and documentaries over artists' films was that labs became accustomed to cutting corners, taking shortcuts to save time and money instead of respecting the filmmaker's intentions. He recounts the following story, which is worth quoting in full:

In the laboratory recently, an American film-maker prevailed upon the services of a technician adept at splicing A and B rolls which had been carefully prepared in advance. The technician was instructed to use a simple 16mm splicer. Days later, returning to the studio, the young film-maker discovered that the technician was using an elaborate editing device; one other than the one recommended and selected and agreed upon. On demanding why the change, the film-maker was told, "It is too trying to use the simple splicer. This is much faster and much easier." The film-maker retrieved his work. To the technician, splicing is a job to be done, just as making a film is for too many film-makers a matter of completing the film and no more. The spirit of the precise action eludes the film-maker; evaporation everywhere.³⁶

Markopoulos proceeds to elaborate upon his criticism of the lab technician, analogizing him to a filmmaker who would merely execute his film without careful consideration. Later in the article, he equates sloppy lab work with other cardinal sins, such as racing to complete a film for a festival deadline or losing one's ideals to commercial impulses. For Markopoulos, the problem with labs was not simply that they were inadequate, but that they were enmeshed in the vulgarities of the commercial film business, on the wrong side of the art vs. commerce divide.

This sentiment was shared by others of Markopoulos's generation. James Broughton, for example, also complained that labs lacked circumspection, churning out product with little care. "Every film-maker complains about labs," Broughton grumbled. "This is because they are set up just to grind it out, and when you want special effects, careful optical prints, and all the subtleties that can make cinema freshly expressive, they are not prepared to give you this attention."³⁷ Broughton suggests that labs are optimized for assembly-line jobs such as processing and release printing, but when it comes to creative labor, harnessing the particular qualities of the medium

that make it suitable for artistic expression, they fall short. Like Markopoulos, Broughton believed that the demand for care and attention was at odds with the need to standardize labor for maximum efficiency. This rendered post-production the least appealing aspect of the filmmaking process: “The worst agonies of cinema pertain to the end of the process more than the beginning: the mixing, matching, labbing, printing.”³⁸

Not all filmmakers were ideologically opposed to labs. The experience of Bruce Baillie, for instance, suggests that labs could be both supportive and discouraging, depending upon the quality of their work. Early in his career, Baillie, along with fellow filmmakers Will Hindle and Scott Bartlett, worked with Multichrome Labs in San Francisco, which he later recalled quite fondly: “In our early filmmaking years, the labs were especially helpful and often friendly: The elder Mac McKinney, of Multichrome on Gough Street helped get me underway... Mac had a WC Fields nose, like a glass hen’s egg in color—from long exposure to toxic photo chemistry. His son, Mac II took over for some years before Multichrome disappeared. He was also a good man.”³⁹ But Baillie also had terrible experiences with labs. In 1968, he reported to Canyon Cinema on “how bad all the labs are. We have got to work toward setting up a few labs of our own. I sometimes wait months for a print of *Quixote* from Western Cine in Denver. A recent print omitted B-roll through one section, then skipped one frame at the head of each scene on another section... I have spent one entire year now attempting to obtain a satisfactory printing master.”⁴⁰ Unlike Markopoulos or Broughton, Baillie’s frustration with the process is less ideological than rooted in the practical difficulties of obtaining a desired result.

Perhaps because subsequent generations of filmmakers felt less pressure to establish avant-garde filmmaking as a legitimate artistic endeavor, their relationships with labs were more respectful than contentious. While their predecessors had developed something of a reputation

for standoffish behavior, younger filmmakers developed a stronger sense of professionalism. For instance, Nathaniel Dorsky discloses: “Often, experimental filmmakers make a mistake, where they try to nickel and dime the lab at the beginning. They say, ‘I’m an experimental filmmaker, and I stand for this and that,’ but I would never do that. My theory with the lab is: Go in completely on their terms, pay your bill promptly, establish a momentum with them. Go in generous, and then they’ll be generous, too.” Similarly, Peter Hutton explains: “If you impress upon [the lab] that you respect what they’re doing, they’re going to work a little harder to make you happy. They’re trying to establish a good relationship with a client. And, like in any business, what’s small potatoes one day could be big potatoes down the road.”

Along with professionalism, the next generation was more receptive to the idea that their relationships with labs could be reciprocal. Instead of a disinterested employee punching a clock, the best lab techs could be artisans with valuable skills to impart. In many cases, filmmakers sat with the timers and negative cutters, cultivating professional friendships and learning the tricks of their trade. When he worked at a lab, Hollis Frampton discovered that everyone tried to get better service by telling him a joke; his hours spent with Joe Williams, the timer for his own films at Filmtronics, were often spent sharing the vast mental repositories of jokes they had accrued from years in the business.⁴¹ M.M. Serra notes: “[In the lab], I’m having a conversation with the technician. I want to sit there with him and look and listen to the sounds. I learned a lot [from sitting with the timer]. You learn to listen.” Jeanne Liotta, who worked with Colorlab on *Observando El Cielo* (2007), agrees: “Chris Hughes is still the best color timer I ever worked with, we choked up when trying to describe nuances of colors to each other over the phone when timing the first print. What a sensitive artisan! I really learned a lot from the workers at the labs, mostly they were very patient and helpful and happy to share knowledge. I sat with the negative

cutter for *Observando*, brought him coffee and listened to his stories.”

This close interaction was mostly possible in smaller labs, which demonstrates the degree to which avant-garde filmmakers benefited from the proliferation of specialized labs in the 1960s. In larger cities, the differing capabilities of specific labs formed a kind of folk culture, derived from experience and word-of-mouth. In New York, for example, A1 Reverse-o-lab was known for cheap reversal processing, first in black-and-white and then in color, but their hit-or-miss quality made them an appealing choice for duping found footage or getting “slop prints” (untimed, black-and-white dupes of the workprint that aid in sound mixing). Kin-o-lux was also good for black-and-white reversal, but if a filmmaker shot color reversal, Cinelab was the more logical choice. Once Cinelab went out of business, Lablink took over the 16mm market. If a filmmaker shot in 35mm (a rarity in the avant-garde), the film would need to go to a bigger lab, like DuArt. On the other end of the spectrum, Bebell & Bebell and, later, PacLab, were equipped for Super-8.

This informal and constantly shifting hierarchy affected the experiential quality of working with a lab. Lenny Lipton noted that “in a small lab, you may find yourself talking to the owner or his son, brother or nephew. In larger labs, you may have to talk to the lab manager; in still larger labs, you may have to take your questions to specialists in each department, such as printmaking or sound work.”⁴² Janie Geiser articulates the advantages of working with a smaller lab from an artist’s point-of-view: “Lablink was like a family. It was kind of a hole in the wall, you had to walk up some stairs and there was this wonderful guy named Tony. And he just really liked all these experimental filmmakers, and he was very personable, and you could talk to him directly. It was like a routine; you could depend upon it.”⁴³ Geiser’s fond recollection of Lablink points to the fact that certain labs were friendlier to the avant-garde than others. In the 1960s, Jonas

Mekas, acting on behalf of the Film-Maker's Cooperative, coordinated with film labs to process and print most of the films of his favored Underground directors, including Jack Smith, Ken Jacobs, Barbara Rubin, Marie Menken, Andy Warhol, Storm De Hirsch, and Ron Rice, among others. Most frequently, he would use smaller labs, especially Criterion Film Labs, Lab-TV, Video Film Lab, and Filmtronics. Occasionally, he would use a bigger lab, such as Movielab or De Luxe.⁴⁴ Because they illustrate some of the tangible differences in working with labs of different sizes and capabilities, two other labs are worth discussing in more detail.

Cinelab, a medium-sized lab that specialized in color reversal, was started by Marvin Soloway, a lab veteran who began his career as a chemist for Movielab, a behemoth that catered primarily to the Hollywood studios. In the mid-1960s, Soloway noticed that news organizations were carting their Ektachrome over to the Kodak processing plant in Fairlawn, New Jersey, where drivers would wait overnight in their cars to rush the processed film back to the station. With some investors, Soloway opened Cinelab to service the news market. Cinelab's biggest client was ABC, but it also worked with NBC, CBS, and documentary filmmakers with contracts at PBS, including Ken Burns. But Soloway had a soft spot for avant-garde filmmakers, and his roster boasted Carolee Schneemann, Alfred Leslie, Rudy Burckhardt, Ken Jacobs, Robert Downey, Sr., and Warhol's Factory crowd, among many others. Soloway recalled, "I got more involved with the avant-garde filmmakers than most lab owners did. My employees were told that these people were our people, they were prime to us. And they recommended a lot of other avant-garde filmmakers to us, and we built up a rapport with them."⁴⁵ Soloway would make trades for film processing, provide space for filmmakers to screen their films on site, and take artists out to lunch, where they would talk about their current film projects. In fact, Soloway sat on the board of directors of Anthology Film Archives for decades following Cinelab's demise in

the 1980s.

Avant-garde filmmakers had a more tenuous relationship with DuArt, a lab so large and well established that most had at least one experience with it. Once the business of bulk release printing for the studios dried up in the 1950s, DuArt fell upon hard times, until Irwin Young took over from his father and reoriented the lab to the growing indie film scene in New York.

Expanding into every possible market, DuArt offered full services in 16mm and 35mm, black-and-white and color, negative and reversal, optical effects and blow-ups, and videotape. Their clients included top tier independents, such as Woody Allen, Spike Lee, Robert Altman, Jim Jarmusch, Errol Morris, and John Sayles.⁴⁶ But avant-garde filmmakers had mixed reactions to the relative impersonality of working with such a professionally oriented lab. Some filmmakers, such as Ernie Gehr, M.M. Serra, and Mark LaPore were willing to pay DuArt's high prices to get the best possible quality for their films, which the lab reliably provided. Others, however, felt inconsequential and poorly treated by a lab that was mostly interested in feature work. Lewis Klahr acknowledges that DuArt's quality was always good, but "you had the sense that they were polite, but they didn't really care. You didn't do enough business for them to care about you. They weren't interested or excited, it didn't matter to them; they cared about features, but you were small business." Henry Hills is blunter: "I always felt when I went to DuArt that I was [treated like] some squirrely loser. They gave me the creeps."

Smaller labs were more affordable and provided easier access to the technicians, but they also contributed to a social milieu that became an essential part of the avant-garde filmmaking community. Standing in line to pick up a roll of film, Klahr once found himself next to Laurie Anderson, while Nathaniel Dorsky would meet Jonas Mekas on the subway headed uptown to the lab, their arms filled with cans of 16mm film to be processed. Although this anecdotal aspect

of filmmaking has seldom been discussed by critics or academics, it formed an indispensable component of filmmakers' working processes, embedding them within a larger network of film-related professionals who drew upon the same technological base. Of course, avant-garde filmmakers made highly idiosyncratic use of the technology, forming a set of aesthetic traditions with their own histories and lineages. But what role did the labs play in supporting these aesthetic traditions? How did avant-garde filmmakers push fairly routine lab procedures to their limits? And, most importantly, what were the effects on the films?

Aesthetics and the Lab

In many respects, avant-garde filmmakers used the lab for the same services that other filmmakers did. Processing, making workprints, timing, and release printing were the mainstays of lab activity, regardless of the kinds of films being made. That said, there remained two broad possibilities for an artist eager to experiment: pushing routine lab procedures to extreme ends or pursuing completely unorthodox, radical approaches to lab work. For the most part, the latter option was uncommon, due in no small part to the fact that a commercial enterprise would seldom allow an experimental filmmaker to turn its business model upside down. Therefore, it was far more common for the avant-garde to revise the standard procedures for their own purposes, either through hyperbolic amplification or idiosyncratic application. This made the lab more technologically limiting than 16mm or the optical printer, which presented greater opportunities for formal innovation. As the following examples demonstrate, some of the most significant aspects of working with a lab were simply avoiding problems and coping with inevitabilities.

Of the more labor intensive services that labs provided, timing was considered the most

important. Timing is a process whereby a lab technician, called the timer or grader, determines the best exposures and/or color values for each shot in the film. In the early days, timing was adjusted according to a scale that divided exposure into 21 equal increments, which were called “points.” If necessary, the printer would adjust light density at the beginning of each shot, cued by a tab or notch on the film. Later machines had scales of 44 or 50 and upgraded the notch system to computer control. Around the 1970s, it became more common for labs to purchase a Hazeltine, which allowed the timer to make corrections from a video monitor. In some labs, the timer worked in isolation and consulted with the filmmaker after the initial work had been done, but in others, a filmmaker could pay to sit with the timer and make suggestions in person, potentially saving time and money down the road.⁴⁷

At the workprint stage, a filmmaker had several options depending upon the amount of money he or she wished to spend. A one-lite print was made with the same printing light (usually somewhere in the middle of the scale) for the whole roll of film, making no compensations for variance in exposure or color. A best-lite print was also made with a single light, but the timer would first inspect the roll to determine which point would provide the best overall result. While labs could also fully time the workprint, it was more common (and affordable) to save timing for the answer print, which had been edited and prepared for additional effects, such as fades or dissolves. Crucially, the lab provided filmmakers with timing sheets, which recorded the light values chosen for each shot of the answer print. This allowed filmmakers to return to the lab with detailed instructions for the next answer print, such as: “Scene 19 should be moved up two points,” or, “The shot at three feet, 14 frames has a blue cast that should match the shot at 18 feet, 7 frames.” Of course, filmmakers had to pay for each additional answer print, so some were more exacting than others in the timing process.

Timing had important ramifications for filmmakers' working processes. Within the avant-garde, some filmmakers prided themselves upon their ability to nail the exposure in-camera, while others were less absolute in shooting, preferring to make the necessary adjustments at the lab. As discussed in Chapter One, Peter Hutton has built a considerable reputation as a master cinematographer, capable of harnessing the medium to render the natural world with astounding delicacy. But Hutton's films were not especially complicated timing jobs for the lab, because his cinematographic knowledge allowed him to capture the proper exposure while shooting. "If you nail it out of the camera, you have less problems with the lab," Hutton attests. "If it's all over the map, you have to adjust things and move things around. I don't regard myself as a particularly experimental or artistic filmmaker. I'm doing a traditional thing in a simple way, hoping that the quality sort of makes it distinctive."⁴⁸ This puts us in a better position to reevaluate the examination of Hutton's films in the previous chapter. As discussed, Hutton's films were shot on Tri-X stock and feature images that dramatically juxtapose light and dark, exhibiting a stark purity in their blacks and whites. For the most part, these qualities are the result of the film stock and Hutton's cinematography, not effects that could be produced in the timing. Not only does this affect Hutton's process, but it contributes to our understanding of Hutton's films as consummately cinematographic.⁴⁹

A different kind of mastery is evident in the films of Janie Geiser. In contrast to Hutton, who shoots almost exclusively outdoors, Geiser's films are animated in her studio. Deriving from her background in puppetry, the films are cloistered chamber dramas enacted by figurines, dolls, and cutouts. Moody and enigmatic, her narratives typically showcase miniature dreamscapes of exacting mise-en-scène. Her figurines are surrounded by antiquated objects that serve as both narrative threads and projections of the characters' interior states. In *Lost Motion*

(1999), a man (“played” by a figurine of a 1940s-era businessman in grey suit and fedora) travels through a series of hypnagogic landscapes in search of a woman. His journey unfolds over complex juxtapositions of dollhouse furniture, toy trains, erector sets, playing cards, gears, ticking clocks, maps, and assorted cutouts. Like Geiser’s other films, the affective dimension is carried through the color palette, which is very precisely defined.⁵⁰ The dominant color is cobalt blue, frequently generated by an offscreen light that hits the objects at angles. The other colors are canary yellow and ruby red, but crucial to Geiser’s aesthetic is the sumptuous black that provides a baseline for nearly every shot; the more vibrant hues always seem to be emerging from and retreating back into a dark, shadowy space.

The success of Geiser’s films depends upon their ability to pull the viewer into a trancelike state, so the careful dissemination of light and color is as important as the appositeness of the objects that she selects for the *mise-en-scène*. Consequently, Geiser worked extensively with the lab to ensure that the colors conveyed the right mood:

I would sit with the timer and talk about what kind of red I wanted, for instance. In my films, it was often about the richness of the black, trying to retain the blackness while having the other colors be what they should be. Contrast was important: How much red is in the yellow? How much green is in this blue? In this one shot!

Geiser’s films also feature extensive in-camera superimpositions. These require aperture adjustments that make it difficult to obtain precise exposures, which increases her reliance on the timing. Geiser admits that her relationship to the timing process is different from Hutton’s in the sense that she came to film after painting, metalwork, and puppetry, so she was more comfortable with the tactile elements of filmmaking than the technical ones. This is not a value judgment, but an acknowledgment that Hutton’s aesthetic, rooted in black-and-white reversal stock and landscape photography, and Geiser’s aesthetic, rooted in color negative stock and puppet animation, require wholly different approaches to working with the lab.⁵¹

In some cases, filmmakers have a specific color in mind, which forces them to engineer the desired hue in the color timing. M.M. Serra's *Turner* (1987) is a quickly cut burst of sensual imagery with a distinctive deep blue and red color design. In short, fragmented edits, we see patterns on textiles, a hand feeding a dog, the filmmaker shooting with a Bolex, floral arrangements, parts of a woman's body adorned in sequins, and trees reflected on the side of a building. On the soundtrack, in a tape loop reminiscent of the work of Steve Reich, we hear a woman's voice reciting an erotic poem about dreams, nature, and "canine sex." The poem also includes the phrase "filtered blue," which seems to reference the film's color palette. In fact, the building in *Turner* is the famous Blue Whale building at the Pacific Design Center in West Hollywood, which houses decorating and furniture markets, restaurants, and a branch of the Museum of Contemporary Art. The Blue Whale is of a very distinctive hue and saturation, which Serra wanted to replicate for the rest of the film. Working at Fotokem in Los Angeles, Serra sat with the timer and appealed to him to match the color of the building. After some adjustment, he was able to translate the color into other shots of the film, providing unity and coherence.

That said, the timing process was often dissatisfying due to the inescapable fact that densities would change from print to print, depending upon the lab, technician, and even particular batch of chemicals in the printer. If a filmmaker spent six months or a year cutting the workprint, timed or not, it was likely that the answer print would look entirely different. Henry Hills describes the problem:

It would take me a long time to make films, at least a year. The lab would give me a timed workprint, I would cut the whole film based on how this workprint looked, and then when you took your negative or reversal A-B rolls to be timed [for the answer print], it was a different timer, the chemicals were different, the colors were totally different. And the first answer print looks like a totally different film. I almost cried the first time I saw my first answer print.

As Hills explains, the variability between workprint and answer print (as well as subsequent

release prints) sometimes made it impossible to edit or superimpose with certainty that formal nuances would be rendered with full force in the final print. It also discouraged changing labs in the course of making a film, because the timer at the new lab would likely be unable to match the work of his predecessor. Peter Hutton echoes Hills's frustration: "I was always stunned by how different the release print was from the workprint."

Even when armed with timing sheets, there was no guarantee that the point values for each shot would reproduce exactly the same way with each new print. The subjectivity of timing was dramatically illustrated to Lewis Klahr when he received an order from the Donnell Library Center at the New York Public Library for seven or eight of his films for their permanent collection. Under the pressure of a deadline, Klahr ordered new prints from 4MC, the lab in Burbank where he had printed most of his films from the previous decade. Unfortunately, the timer Klahr had worked with had left the lab, and his replacement was unable to complete the job. Despite the fact that the lab had retained all of Klahr's point values, there was an elusive quality to his films that prevented them from being duplicated by someone who had not timed them from the beginning. "It wasn't like there was a new film in the mix," Klahr explains. "They couldn't reproduce old work, so I learned that there was more to the [timing] numbers than just the numbers. There was a human element in that interaction that revealed just how subjective and individual it was."

Faced with discrepancies between workprint and answer print, filmmakers could choose to respond in two ways: working with the lab to match the densities and colors that were "supposed" to be there, or accepting the inevitability of change and embracing it as part of the process. The former option was possible, but it could be expensive, time consuming, and other problems could quickly multiply. For example, Larry Gottheim's *Horizons* (1971–73) is a

feature-length film comprised entirely of shots of rural landscapes, mostly wheat fields, barns, roads, and hilltops. In each shot, the horizon line is visible somewhere in the frame, and the film becomes a kind of inventory of all the possible ways to shoot a horizon. *Horizons* indulges in small pleasures of similarity and difference: some shots introduce animals, people, or vehicles; some are stationary, while others provide evidence of a jostling handheld camera; some locations return, shot at different times of the day, while others are glimpsed only once. It soon becomes evident that the film's organization is actually quite rigorous. There are four sections, each corresponding to the season in which the material was shot. The shots themselves are subdivided by one-second pulses of leader, with each season assigned a different color: summer (green), fall (red), winter (blue), and spring (yellow). The shots sandwiched between the leader are themselves organized into patterns of two, three, and four, displaying visual motifs that subtly rhyme with each other, similar to a line of poetry. Over *Horizons*' 77-minute runtime, this seemingly simple film begins to resemble an epic visual poem.

Although Gottheim had already completed seven films, all of them (with the exception of *Barn Rushes* (1971)) were composed of single shots that lasted the length of a roll, so none demanded extensive lab work. *Horizons*, on the other hand, was shot over the course of several years and edited in A-B rolls. Before editing, Gottheim went through an extremely intensive organizational phase, grouping his material on separate reels, drawing his shots on notecards, memorizing every nuance, and ordering them according to specific visual correspondences. There are a great many edits; most shots average one to four seconds, and the 24-frame segments of colored leader are inserted every few shots. Color was extremely important because it carried both micro and macro visual rhymes. For instance, the spring section is at first bright and bold, as if to signal rebirth, but Gottheim ironically reverts back to the colder tones of winter as it

progresses.⁵²

For the processing and workprint, Gottheim used A1 Reverse-o-lab, but he went to TVC Laboratories for his answer prints, which quickly became “a nightmarish experience.” Gottheim explains: “The colors of the first prints were entirely (and unexpectedly) very different from the workprint colors that I mostly loved and were used in the editing process. I had to make elaborate charts for correcting almost every shot, giving the starting footage and frame for each one, with instructions such as, ‘a little darker and less magenta.’” This was a monumental task, given that *Horizons* contains nearly one thousand shots edited according to subtle visual correspondences that would be lost if timed inaccurately. Unable to work directly with the timer, Gottheim purchased several consecutive answer prints, sometimes matching colors to the workprint, and in other instances adapting to new ones. Meanwhile, problems accrued:

It happened that the opaque black leader I had purchased from a reputable supply source had been made from outdated film, and bits of emulsion flaked off, creating light spots in the print where light shone through. I ended up having to apply “opaquing fluid” to these spots on the leader, and this created some other problems as the not-quite dry fluid made spots on the image. Also because there was so much passing of all the splices through the printer, the splices started to come apart, to the consternation of the lab. So this was a humiliating as well as deeply frustrating experience.

According to Gottheim, switching labs, matching the colors of the answer print to the workprint, and having his splices fall apart from wear and tear provided a valuable lesson. In his later films, he adjusted his expectations to accept the lab work as simply another stage in the creative process, rather than an attempt to replicate a predetermined vision. But even after *Horizons* had become a canonical film, the troubles persisted. When Gottheim received a National Film Preservation Foundation award to restore the film in 2004, he had to make more elaborate timing charts, and the process essentially had to be repeated for a subsequent digital transfer.

Given the variability in density and color from print to print, some filmmakers evolved

aspects of their working process to compensate. For many years, Nathaniel Dorsky worked with the lab in a manner similar to Gottheim on *Horizons*. First, he would order a timed workprint. After editing, Dorsky would use the timing sheets provided by the lab as a guide, instructing the timer to match the densities of certain shots while adjusting the point values on others. While this approach was fairly efficient, it was still rather complicated in that Dorsky had to devise a system for naming the shots so that he could later wind through the original roll, match the shots on the workprint to those that he selected for the film, and declare the point value for the answer print. Furthermore, Dorsky routinely ordered five or six answer prints before he was completely satisfied with the appearance of the finished film.

As discussed in Chapter One, Kodak's discontinuation of Kodachrome, the color reversal stock that Dorsky had used since childhood, forced him to shoot in color negative beginning in 2010. At that point, Dorsky modified his lab process, abandoning the timing of his films altogether. Instead of a timed workprint, Dorsky shifted to a one-lite workprint, whereby the point value remains the same for each shot in the film. Dorsky then edits the film as if it were original reversal. "I accept that one light as the reality of the film," Dorsky explains. "If it's dark or light, it's what I intended in my exposures. I don't do timing anymore." For his release prints, Dorsky repeats the procedure, simply instructing the lab to print the films to one light. Dorsky's simplification of the process was instigated by the change in stocks, but it could also be considered an ascetic refinement of his practice, marking his status as a master. In addition to abandoning his light meter while shooting, Dorsky reduced the lab's role in preparing his films, placing all of the emphasis on the triangulation of subject, light, and filmmaker.

Some of the timing problems described in the preceding pages would have been pertinent concerns for filmmakers of all kinds, although they were especially salient for avant-garde

filmmakers, largely because their films were often devoid of the conventional markers used by labs to time the prints, such as skin tones. That said, avant-garde filmmakers are notorious for pursuing unorthodox processes and techniques that would immediately cause problems for most labs. To cite some of the most famous examples: The original of *Mothlight* (Stan Brakhage, 1963) is not a filmstrip at all, but an arrangement of grasses, dirt, and moth wings sandwiched between two pieces of Mylar tape; certain sections of *Fuses* (Carolee Schneemann, 1965–67) were so heavily collaged that the film would not run through a contact printer; *Gammelion* (Gregory Markopoulos, 1968) stretches five minutes of footage to nearly an hour through a labyrinthine series of fades; and *Schwechater* (Peter Kubelka, 1958) and *T,O,U,C,H,I,N,G* (Paul Sharits, 1968) have shots of only one and two frames.⁵³ These kinds of challenges to the lab continued in later decades; for his *Chromesthetic Response* series (1987–90), Scott Stark jammed 16mm motion picture film into 35mm still cameras, complete with misaligned sprocket holes, and exposed the film as still images. After sending several rolls to Kodak for processing, he was threatened with a lifetime ban.⁵⁴ In terms of working with the lab, two of the “most common uncommon” techniques deserve elaboration due to their importance to avant-garde practice: rapid editing and complex multiple-roll printing.

Rapid editing, achieved by cutting together a string of short shots, is a hallmark of avant-garde cinema, both with and without visible splices. This posed a tremendous problem for labs because of the increased risk of breakage, especially if the cement splicing was not performed properly. A lab owner describes the chaos that ensues when a splice breaks in the printer:

If it happens on the down side of the printer, we just grab a basket and let all the film fall into it, so we can at least keep rolling and salvage the print. But if it happens topside, the printer shuts off... If it's an A and B roll or a timed job, we lose the whole thing. Invariably the A roll will go through fine. Then halfway through the B roll, when you can't go back and resync, you blow it, and the film is flopping around in the printer while it's going 120 feet a minute. But no matter how fast we turn it off,

we chew up some film.⁵⁵

Furthermore, broken splices threatened to ruin all of the other films that were cued in the printer, resulting in deep embarrassment for the filmmaker who made the offending splice.

Consequently, labs were sometimes apprehensive about films that were heavily edited.

Filmmakers who wanted to edit in single frames could rephotograph their original on an optical printer, but this would result in loss of quality. Some preferred shorter cuts over optical printing for aesthetic reasons. Recall Luther Price's *Porcelain Ribbon* (1990), comprised of single frame edits made with tape splices, which imbues the strip with the texture of reptile skin.

Henry Hills's *Radio Adios* (1982) and *Money* (1985) provide limit cases for the sheer number of splices labs were willing to indulge. Both films are delirious street movies that employ thousands of edits and disjunctive soundtracks to form gloriously ramshackle language poetry, as well as document the bohemian artist community flourishing on the Lower East Side in the early 1980s. In *Money*, Hills films his friends, an impressive roster of artists that includes musicians (John Zorn, Fred Frith, Arto Lindsay), poets (Susie Timmons, Charles Bernstein, Jack Collom), filmmakers (Abigail Child), curators (Carmen Vigil), visual artists (Christian Marclay), and choreographers (Pooh Kaye, Yoshiko Chuma, Sally Silvers) on the streets of downtown Manhattan, often surrounded by pedestrian bystanders. In broad terms, the participants perform a relay-race monologue, extended in short fragments from cut to cut, about the economic marginalization of the artist. The monologue is hardly linear, however, as Hills interpolates short bursts of the performers posing, screaming, babbling non-sequiturs or nonsense noises, leaping into cardboard boxes, playing instruments, or breaking into spontaneous, Jack Smith-inspired street theater.

Influenced by the burgeoning improvisational music scene in New York, Hills uses his

edits to transform the monologue into a joyous cacophony, a bitter rant turned into a symphonic celebration of the vitality of the artist. The images in *Money* rush by so quickly that an accurate shot count would be virtually impossible. In the first two minutes, I clocked 204 shots; given the fact that *Money*'s runtime is close to 15 minutes, it is reasonable to assume that there are 3,000 to 4,000 edits in the film. Surprisingly, Hills discovered that Cinelab was willing to print both *Radio Adios* and *Money* as one-lite prints, running the risk of the splices breaking. Hills attributes this willingness to Cinelab's acceptance of artists and his ability to make perfect cement splices, honed during his tenure as a graduate student working with Scott Bartlett: "Some labs wouldn't deal with me, because they just didn't want to deal with films like that. Cinelab knew that I knew what I was doing, but they would still always make a big joke: 'Here comes the guy with the million splices!' But I knew that [if I were going to work this way], I had to take care of the splices so the lab would do it. Because they didn't fall apart, they put up with it, but I know they freaked out whenever I walked in."

As with Gottheim's *Horizons*, labs continued to have problems with Hills's films years after their initial printing. In 2013, the National Film Preservation Foundation provided a grant to Anthology Film Archives to preserve *Radio Adios*, but the lab in Los Angeles where the work was contracted declared the film "unpreservable." Although the lab owner cited discolored leader as the reason for his rejection of the job, further investigation revealed that the lab simply did not want to print the film due to the excessive amount of splices. Eventually, the film was printed at Colorlab, the lab most avant-garde filmmakers continue to use—the print was even timed, entailing a staggering 364 light changes in 11 minutes. As Hills's films attest, labs were sometimes willing to tackle films with thousands of edits, but the filmmaker needed to have mastered his splicing technique, as well as demonstrate perseverance.

Another lab procedure endemic to avant-garde filmmaking was complex multiple-roll printing, used to make fades, dissolves, and superimpositions. Filmmakers would commonly distribute their shots across two or more rolls. The rolls were run through the printer one at a time, ensuring that any overlaps in the image would result in a multiple exposure.⁵⁶ With more overlaps, filmmakers could achieve rather complex triple or quadruple exposures, almost as if compositing an image by breaking down each component into a separate layer. If the filmmaker could compensate for exposure and accurately calculate the lengths of multiple overlapping dissolves, the process could become very intricate and almost sensual, described by one filmmaker as “weaving together layers of consciousness.”⁵⁷

Even before attending graduate school at the School of the Art Institute of Chicago, David Gatten had developed a cluster of formal problems that he wished to investigate: multiple sets of long fades occurring at the same time, the point at which onscreen text becomes image, and, above all, the ways in which delicate choreography of these elements could contribute to a film’s pacing. He had the idea that his cinema would play with rhythm by weaving images together, less in the vein of Brakhage’s prolonged superimpositions and more akin to Will Hindle and Bruce Baillie’s experiments in stream-of-consciousness image layering. Ultimately, Gatten desired a cinema of cadences. Because of these particular interests, he knew that he would need to work extensively with multiple rolls, developing scores of fades and dissolves that, in their most complicated instantiations, would require as many as four separate strands of film. Consequently, Gatten attended the Art Institute specifically to study with Shellie Fleming, a filmmaker and teacher who had extensive experience with these procedures.

But Gatten faced several obstacles to realizing the cinema that he envisioned. Most basically, printers were only capable of fades of set lengths: 16, 24, 32, 48, 64, and 96 frames.

This material constraint limited his options, especially considering that Gatten was interested in fades that would stretch to as long as ten minutes in duration.⁵⁸ Gatten was also drawn to the precarious process of cutting his reversal originals without making workprints. Fleming taught him a routine that she had learned from Will Hindle: handling the original carefully, Gatten would project the film three times, taking scores of notes. He would begin to pre-visualize the film, knowing that he would be unable to see it in projection until it was completed. He then cut his originals into two or three rolls, understanding that his cement splices could not be undone (at least without losing frames). Gatten found that this “do-or-die” approach to filmmaking forced him to consider carefully the ramifications of each edit or superimposition, sometimes limiting him to the rate of two or three splices per day.

The combination of multiple-roll printing and cutting original forced Gatten to stare at strands of film on a light table, trying to imagine how particular orchestrations of fades and dissolves would appear in projection. If a 42-frame line of text faded over a 96-frame dissolve of two images, what would be the effect? Without the possibility of previewing, Gatten’s process became one of imagination conditioned by constraint. As it was for Fleming, designing his films in relation to speculative and irrevocable lab procedures was as much about a mode of being as an aesthetic result. Gatten explains:

The philosophical and conceptual component of studying this method with Shellie was that the editing decision that you can’t imagine, pre-visualize, or control becomes an inscription of your psychic process and aesthetic decision making. It’s like life: you come to terms with your mistakes and the things that you can’t change and attempt to learn from them. This is how we live our lives. We make a decision in some level of ignorance but with hope, and then the world responds, and sometimes that response is amazing, inspiring, and delightful, and sometimes it’s a disappointment. That’s part of the lesson of working this way. You can’t control it—you have to practice your craft in order to get there.

But there was also a practical concern, namely that the vast majority of labs charged

between \$5–7 per fade. Gatten’s films necessitated hundreds of fades, which threatened to raise the cost of a single print to thousands of dollars. This had a direct impact on Gatten’s aesthetic, as he was forced to reckon with each fade or dissolve, deliberating whether it was an absolute requirement for the film. Fortunately, Gatten discovered Film Craft Lab in Farmington, Michigan, a regional lab that surprisingly did not charge per effect. When Gatten questioned the practice, the owner told him that they were willing to take a little extra time because they liked working with artists. Gatten credits this policy with enabling him to make films such as *Moxon’s Mechanick Exercises, or, The Doctrine of Handy-Works Applied to the Art of Printing* (1999): “I could make a film that had all these cue changes, and it didn’t cost anything. That allowed me to explore in depth multiple-roll printing, lengthy superimpositions, and use of text in combination with image in a way that I would not have been able to afford. By not charging, they made my cinema what it is.”

An example from one of Gatten’s films demonstrates the ways in which these techniques work in tandem. In *Moxon’s Mechanick Exercises*, Gatten employs a process that involves affixing Scotch tape to books and then boiling the paper away, leaving only the imprint of the words on the tape. These words are then printed onto high-contrast film stock and magnified in an optical printer so that, in some cases, only a single letter or part of a letter will be visible. Gatten then distributes these words over multiple rolls and choreographs a series of fades and dissolves at irregular intervals. So, the words “anything,” “Bible,” and “Gutenberg” (A roll) appear in a large typeface before a second set of text, illegible and in a different font (B roll), is overlaid over the words, producing a kind of word soup. Then, a third, more regular block of text fades in (C roll) as the A roll fades out, so that the texts on the B and C rolls establish a new relationship. The effect is that of a complex word collage that unfolds in time, with text treated

as an abstract visual element, not unlike the physical marking associated with handmade cinema.⁵⁹

Gatten's synthesis of handmade processes, optical printing, and multiple-roll printing indicates the extent to which all of the techniques discussed in this dissertation are interrelated. Only the largest labs, such as DuArt, had in-house optical departments; most optical effects in 35mm were contracted to optical houses, separate businesses only tangentially related to labs. But the avant-garde had one man who served as both an optical effects wizard and liaison to the New York labs: Bill Brand. Brand began his career as a studio assistant to Paul Sharits and technical advisor to Hollis Frampton. He also founded Chicago Filmmakers and became one of the most thorough explorers of the optical printer in films such as *Circles of Confusion* (1974), *Works in the Field* (1978), and *Split Decision* (1979). In 1976, Brand began doing favors for some of his friends, blowing up their films from Super-8 to 16mm. Shortly thereafter, he went into business as BB Optics.

In addition to his own films, Brand was especially important for the avant-garde because he served as a technical guru and intermediary, helping filmmakers with the post-production process, and later, working with institutions and foundations to preserve their films. Brand's clients include Marjorie Keller, Saul Levine, Gordon Matta-Clark, Lewis Klahr, Manuel De Landa, Tony Conrad, Bruce Nauman, Vito Acconci, Barbara Hammer, Todd Haynes, Ken Jacobs, Yvonne Rainer, and Rosa Van Praunheim, among hundreds of others. BB Optics was invaluable because it arrived at a moment when filmmakers were increasingly drawn to Super-8, a gauge that did not reproduce well. Filmmakers would often show their originals, which posed a number of risks from a preservation standpoint. Brand's background as an artist allowed him to translate the needs of avant-garde filmmakers to the labs. Brand observes: "There just aren't

many people in labs who understand the work and its context in the way I do... And having been part of making films in that way I can understand when I see something [that needs to be treated in a particular manner]. I know what kind of splicer was used, I know the labs that were used to make the prints, and even who some of the timers were.”⁶⁰

Most of this discussion has addressed lab procedures that affect the formal characteristics and aesthetic paradigms of avant-garde cinema. But content was also a concern for the labs, especially considering that the avant-garde had developed a reputation for films containing explicit sexual imagery. It was a real possibility that “obscene” films would be censored, confiscated, or destroyed by the lab. Although labs have been left out of most of the history of censorship, they played a critical role in the controversies that engulfed the avant-garde in the 1960s and continued to be relevant through the 1990s. Interestingly, this history aligns with that of hardcore pornography, another 16mm-based mode that was illegal in the 1960s, but gradually rose to mainstream prominence as obscenity statutes crumbled in subsequent decades. In the next section, I examine the relationship between the avant-garde and pornography through their unlikely convergence in film labs.

The Avant-Garde, Pornography, and Censorship

In the 1970s, Monaco Film Labs, a well-known film laboratory in San Francisco, threw a celebratory dinner party to honor their most valued customers. In the banquet room of a large hotel, the owners seated the illustrious avant-garde filmmaker Barbara Hammer—whose films *Dyketactics* (1974), *Multiple Orgasm* (1976), and *Women I Love* (1976) depicted a radical and liberatory celebration of lesbian identity—next to the Mitchell Brothers, who were riding high on the success of their mainstream porn crossover *Behind the Green Door* (1972). Despite the fact

that Hammer had recently presented an anti-pornography paper at San Francisco State with the Mitchells in attendance, Monaco was excited about Hammer's lesbian-centric filmmaking because it seemed connected to the "porno chic" movement of the early seventies. Much to her exasperation, Hammer's emancipatory gestures were viewed by the lab as a logical extension of the pornographic female coupling on display in *Green Door*.⁶¹ This dichotomy, often a cornerstone of anti-censorship debates, is familiar: artists use sexually explicit images for art's sake, often challenging or subverting traditional morality, while pornographers use them artlessly for commercial gain. Consequently, the fact that film labs understood these distinctions to be highly fluid, two sides of the same coin, should interest scholars immensely.

In the 1960s and 1970s, it was something of an open secret that many small-to-medium-sized film labs, of the variety frequented by avant-garde filmmakers, also processed and printed pornography, which was also a 16mm reversal business. Marvin Soloway, the owner of Cinelab, admits that, "everybody was processing porno at night and on weekends."⁶² This raises a host of questions: How were pornography and avant-garde filmmaking, united in their deviancy, treated by the labs? How did the avant-garde piggyback on a commercial industry with which it had little in common to further a more radical, politicized notion of sexual politics? And to what degree was the institutional framework of the avant-garde, which is often thought to be autonomous and self-sustaining, imbricated within other non-Hollywood filmmaking modes, such as amateur cinema, journalism, sports broadcasting, and pornography?

The imbrication of the avant-garde and pornography in the labs dates back to the early 1960s with Jonas Mekas's censorship wars on behalf of the New American Cinema, which have generally been well documented. In late 1963 and early 1964, Jack Smith's drag-queen romp *Flaming Creatures* (1963) had become a target for the police under extant obscenity laws.

Mekas, the film's champion, had turned *Flaming Creatures* into a *cause célèbre*, provoking small riots in New York and Belgium. On the evening of March 3, 1964, the film was exhibited at the New Bowery Theatre in the East Village along with other films by Smith and Andy Warhol. The police raided the theater and arrested Mekas along with other representatives of the Film-Maker's Cooperative. Upon his release from jail, Mekas wrote a scathing indictment of the judicial system in "Movie Journal," his weekly column for *The Village Voice*. He then deliberately escalated the situation by showing Jean Genet's *Un chant d'amour* (1950) four days later, an action for which he was again arrested.⁶³

While awaiting his trial date, Mekas launched an attack on the obscenity laws, which he insisted were "driving art underground." Mekas wrote: "Who among you dares pose as judge of our art, to the degree of dragging our art into the criminal courts? In what times do we live, when works of art are identified with the workings of crime? What a beautiful insanity!"⁶⁴ Despite the fact that nudity of almost any kind was considered obscene under prevailing laws, 1963 and 1964 were especially productive and provocative years for the Underground, and they would later cement its reputation for being, in the words of Ara Osterweil, a "flesh cinema."⁶⁵ Writing in his journal late in 1963, Jack Smith noted:

All the flaming young directors shot nude stuff this last summer. Naomi Levine made a movie wherein little kids swatted each other with armfuls of huge white flowers. And some of the kids pants were fallen down—revealing them... NAKED!... BOO!! Barbara Rubin has made a ballet of sexual organs movie, which you will never see, whether you would like to or not. Because you have given control to censors you cannot see this film by Barbara Rubin, an eighteen year old girl whether you might or might not decide that you can take it.⁶⁶

In scholarship on this period, film labs play virtually no role. At the time, however, the labs were specific targets of Mekas's ire over what he perceived to be a prudish attitude toward the New American Cinema. In his "Movie Journal" column from the Fourth of July, 1963, Mekas

lumped together the labs with the censorship boards that he had lambasted weeks prior:

Two months ago I received a worried telephone call from Ray Wisniewski. He took a roll of his new film to Lab-TV for developing. The lab developed it, gave it a look, and decided it was objectionable: there were nude scenes in it. Ray was informed that the film could not be given back to him, it must be destroyed... At best, they were willing to return it with deletions... You can go to the law books to defend any evil thing.

Two weeks ago Naomi Levine took her film to Lab-TV. Her footage was seized on the same grounds of nudity. Moreover, the cops were sent after her. It took much talking by the Film-Makers' Coop to get her footage out. Now Naomi has in her lap a pile of exposed film, with no place to go.

Two weeks ago Jack Smith took his *Flaming Creatures* to Video Lab to have a print made. The lab rejected it: objectionable. The Film-Makers' Coop took the film to Movielab... Back it came like lightning. Next, the film was sent to Filmtronics lab. Back again it came. It is now sitting on the Coop's table; nobody wants to touch it... Who do the labs think they are? Are they in the censorship business or are they in the film developing business?⁶⁷

Like Markopoulos with quality, Mekas positioned the battle over censorship at the lab as an ethical struggle over the art of the film. And, in true Mekas fashion, he channeled his vitriol into a declaration of freedom: "We'll pull our work out of Lab-TV, out of Movielab, out of Video, Filmtronics, and all the rest of those who are in the censoring business. A new lab is needed. I don't think it is even worth fighting the labs on legal or humanistic grounds. It is too silly. The thing to do is for someone to open a new lab, a Free lab."⁶⁸

In reality, however, Mekas did not open a new lab. In fact, he sent most of the Underground's sexually explicit films to Criterion Film Labs, which was located on West 60th Street, just north of Columbus Circle. Criterion was owned by Fred Todaro, a color film specialist who had been hired away from Movielab in the summer of 1955 to expand the color services of Circle Film Labs; with the assistance of Barbara Decker, an accountant who later became his wife, Todaro purchased the lab and re-named it Criterion. Todaro retained most of the personnel from Circle, which amounted to seven or eight employees. In the early years, they mostly catered to the burgeoning television and industrial market, boasting accounts such as

Screen Gems, Castle Films, United Press International, and *National Geographic* filmmaker Campbell Norsgaard. But Todaro was also open to more sexually explicit material.⁶⁹ From 1963 to 1965, Mekas, as the head of the Film-Maker's Cooperative, was coordinating with film labs to process and print most of the films of his favored Underground directors, including Jack Smith, Ken Jacobs, Barbara Rubin, Marie Menken, Andy Warhol, Storm De Hirsch, and Ron Rice, among others. Although there were five or six labs that Mekas frequented, receipts at the Coop suggest that most of the films with nudity or sexual content were sent to Criterion. These films included most of the films mentioned by Smith as the "nude stuff" that marked the summer of 1963: Naomi Levine's *Yes* (1963) and *Jeremelu* (1963), Smith's own *Flaming Creatures*, and Barbara Rubin's *Christmas on Earth* (1963), the most sexually explicit film of the Underground. Criterion also processed Andy Warhol's *Haircut (No. 1)* (1963), which included full frontal male nudity, as well as work by Kenneth Anger, who was a frequent target of the censors.⁷⁰

Mekas's choice of labs was significant in that Criterion would become a key player in the pornographic film business. Unlike other labs, such as Triple A, Arro Labs, or Image House, which were underground operations devoted exclusively to pornography, Criterion was a legitimate lab with connections to the mainstream film industry. Like many labs, however, Criterion processed pornography on nights and weekends. Much of this was a financial strategy aimed at combating the rise of videotape. Barbara Decker, Todaro's widow, recalls:

When videotape became very popular, pornography came in. The labs who had money, who were able to convert to tape, they were OK financially. We didn't convert to tape, so we were really hurt. We were not switching to videotape. It was expensive to buy the new machinery. And then when big networks started to buy up all the small stations, that was a big blow to the industry and especially to us. Porn became an easy buck. If you processed it, it was an easy dollar, all cash money.⁷¹

For a time, Todaro's investment in the pornography business was lucrative. In 1968, Criterion

moved to a larger building on 55th Street and bought a number of processing machines, which attracted the attention of Hollywood studios, who hired Todaro to make release prints of *Chitty Chitty Bang Bang* (1968) and, later, *Last Tango in Paris* (1972). In the 1970s, however, the Mafia's control of the so-called "42nd Street Business" made processing pornography a dangerous occupation. In 1972, a porn producer and distributor named Robert Surretsky was arrested along with Mafia-affiliated Robert DiBernardo of the DeCavalcante family and six other men for processing and distributing hardcore. At the trial, Marvin Soloway was called to testify; the prosecution described Soloway as "slimy" in the *New York Times*.⁷² Todaro also had Mob connections through his nephew Douglas Rega, who ran a lucrative business for the infamous DeMeo crew duping porno footage at Criterion. In 1977, Todaro and Rega, along with two other men, were arrested for processing child pornography.⁷³ After a dispute arose between Rega and Todaro concerning the ownership of the building and its laboratory equipment, Rega hired the DeMeos to murder Todaro, a crime for which he was convicted in 1989.⁷⁴

Hardcore pornography, the Mafia, and murder would seem to be a far cry from Mekas's New American Cinema. In truth, Criterion's work for Mekas likely predates their intensive involvement in pornography. Undoubtedly, however, Mekas found a lab willing to process footage as graphic as *Christmas on Earth* or *Flaming Creatures*, despite the fact that his public rhetoric emphasized the unwillingness of labs to touch such objectionable material. Although Mekas was not especially critical of pornography, even referring to it occasionally as "beautiful," he was careful to rhetorically position the Underground as separate from pornography by appealing to Hegelian aesthetics.⁷⁵ In a manifesto, Mekas writes:

Works of art are above obscenity and pornography—or, more correctly, beyond what the police understand as obscenity and pornography. Art exists on a higher spiritual, aesthetic, and moral plane... Art is concerned with the spirit of man, with the subconscious of man, with the aesthetic needs of man, with the entire past and future

of man's soul. Like any other art, like painting, music, or poetry, our art cannot be licensed or censored.⁷⁶

While one could read this passage as an example of Mekas's purity, I would argue that it serves as a striking example of Mekas the pragmatist, the intrepid promoter who cannily found ways to amplify the cause of the New American Cinema. Undoubtedly, most avant-garde filmmakers considered their films to be works of art, and it would be difficult to argue that their films were consumed in the same manner as pornography. On the other hand, Underground films would almost certainly have been censored, confiscated, or destroyed had it not been for the willingness of labs to process their footage alongside pornography. Apart from the rhetoric and political posturing of both Mekas and the courts, technological common ground enabled both genres or modes to circulate in this period.

And, in fact, many avant-garde films were confiscated by labs. An early film by Kenneth Anger, *The Love That Whirls* (1949), was supposedly destroyed by an Eastman Kodak processing lab technician, who objected to the nudity.⁷⁷ In the late 1960s, DuArt refused to print a film by Tom Chomont that included male frontal nudity. When he showed up at the lab to pick up his processed film, they made him dump the offending portions into a bucket of water. A teenager at the time, he was too intimidated to fight back.⁷⁸ Around the same time, Andrew Noren had material confiscated, a reportedly degrading experience.⁷⁹ In making his sexually explicit *The Bed* (1968), James Broughton recalls: "When it was finally edited I could not persuade any commercial laboratory to print it. From Eastman in Rochester to Consolidated in Los Angeles I received curt refusals: it was against official policy to print 'frontal nudity.' Finally, I located an illegal pornography outfit which printed much frontal nudity between midnight and dawn in the rear of a building on a back street in East Palo Alto."⁸⁰

The interaction of the avant-garde with the porn industry (as well as some major

differences) at the lab are illustrated by Carolee Schneemann's *Fuses* (1965–67), one of the most celebrated and sexually explicit films in the avant-garde canon. *Fuses* was shot over the course of several years, with Schneemann processing the footage a little at a time. The F.B.I. had been confiscating suspicious-looking material at labs, and Schneemann was anxious because she could never be quite sure if the latest batch of footage included sexual imagery or something more innocuous, like landscape photography. Stan Brakhage suggested that she send her footage to Western Cine in Denver for processing. With each hundred-foot roll, Schneemann sent a cover letter, drafted by a friend's psychiatrist husband, explaining that the footage was in the interest of science in the event that the lab was raided. When the processed rolls were returned, Schneemann would edit and collage the film in upstate New York before taking it into the city for printing.

Stan Vanderbeek recommended A1, a lab that, unbeknownst to Schneemann, was notorious for printing pornography. Understandably, the owners of the lab, Vince Gretina and Frank Barone, did not find the film especially obscene, and they printed it at night along with the pornography. But in one respect, they found *Fuses* upsetting. Schneemann recalls the day that she came in to pick up the "Blue Section" of the film, which featured cunnilingus:

One afternoon, I came in to look at my footage and [Vince and Frank] are shuffling their feet, looking like embarrassed children, and they say, "We just printed the Blue Section." "Oh?" "We want to know," they shuffle their feet, "ugh... Does she like what he's doing?" I said, "If she didn't like it, she'd say, 'let's not do it anymore.'" They looked abashed and said, "Yeah, but if I did that to my wife, she'd kick me out of the house!" Subsequently, I find out that they have the biggest porn lab in all of the United States down in the basement!

It is entirely possible to read this anecdote as one of two men taking the opportunity to ask a woman about sexuality. After all, it is likely that Gretina and Barone were familiar with cunnilingus from their pornography business. On the other hand, it could be read as an

encapsulation of the tension at the heart of the labs' handling of sexual imagery. On the one hand, the Underground was no different from any other pornography that constituted the main revenue source for some of the labs. But on the other hand, the labs could still be shocked by the progressive affront to conventional morality that made the avant-garde more challenging. It is possible that the labs were less troubled by the content of the images than their frank depiction of female-centric sexual pleasure.

Although *Fuses* was unquestionably explicit, few lab technicians would have mistaken Schneemann's film for pornography, especially considering the degree to which Schneemann obscured the action with painting, collage, and other physical manipulations to the filmstrip. Other films, however, were more textually ambiguous, blurring the lines between pornography and the Underground at the level of the imagery itself. For instance, Wakefield Poole was already an established dancer and choreographer before he started experimenting with film, which he claimed stemmed from an interest in visuals. Poole's first filmmaking efforts were not unlike those of the Underground, short films that featured heavy emphasis on techniques such as dissolves, in-camera double exposures, and split screen. Describing his process, Poole explained: "I tried everything. I'd film the reflection of the New York skyline in the Central Park lake by turning the camera upside down and shooting only the reflection."⁸¹ Poole's early film, *Andy* (1968) is a short portrait of Andy Warhol's retrospective at the Whitney comprised of dissolves, multiple exposures, and pixilated flashes of Warhol's paintings, a film that is in fact quite similar to Warhol's own *Elvis at Ferus* (1963). When Poole began his first porno film, *Boys in the Sand* (1971), this interest in the visual style of avant-garde filmmaking carried over; viewed today, his films are lyrical odes to queer utopia, with hardcore sex scenes infused with lightly experimental touches, like light dappling on trees and fun-house mirrors that distort the action. For that reason,

Poole always maintained that he was more interested in art than pornography: “I’d made money making porno movies, but I never thought of myself as a pornographer.”⁸²

In *Bijou* (1972), Poole experimented with a range of techniques common to the Underground. The principal action, which involves a construction worker participating in an orgy with a group of anonymous, tantalizing strangers occurs in an entirely black room with no walls, which frequently makes it seem as though the action is taking place in an abstracted void. There is aggressive use of split screen, especially in a sequence in which five men are introduced in separate film-within-a-film boxes, ultimately climaxing at the same time. Furthermore, Poole’s admiration for Andy Warhol extended to his working methods. Surprisingly, Poole introduced a psychodramatic element into pornography: “I set up little situations ... without letting the actors in on them. After questioning them at the interviews and filming them, I knew how each would react in a given situation. I knew that Bruce would have to touch [Cable], and I knew that when he did, Cable would reject him. The rejection would tell the observer a lot about both characters, and viewers could relate.... I only had to stay aware during the orgy and catch these spontaneous moments on film.”⁸³ As scholars such as J.J. Murphy have shown, this strategy, in which the director exploits the interpersonal tension that exists between his cast members in reality, is a staple of Warhol’s cinema, crystallized in the shocking moment in *The Chelsea Girls* (1966) when Ondine unexpectedly slaps Ronna Page.⁸⁴ Even at the level of exhibition, Poole followed Warhol. *Boys in the Sand* and *Bijou* both had extended premiere runs at the 55th Street Playhouse, where Warhol showed his sexploitation films.

Poole later recalled: “I also had trouble getting [*Boys in the Sand*] processed. I would meet a technician from Guffante Film labs at a coffee shop around the corner, give him the film in a brown grocery bag, and he would return the processed film the same way. It was so covert, you’d

think we were trading in top-secret material. At that time, though, we could have gone to jail for what we were doing.”⁸⁵ Once it was time to synch the image and sound tracks, Poole, who had virtually no experience with 16mm film production, turned to Marvin Soloway at Cinelab, a medium-sized lab that specialized in color reversal. Soloway was suggested to Poole by an independent filmmaker, Bobby Alvarez, who was editing the documentary *Woodstock* (1970). Interestingly, Poole later observed that “Marvin encouraged young independent filmmakers by guiding them through the rough spots. He still does.”⁸⁶ Soloway later declared without judgment that Poole’s films were “the best gay porn films ever made, very artistic with really interesting visuals” despite the fact that Soloway himself had no real investment in gay pornography outside of its business potential.⁸⁷ In other words, both Poole and Soloway thought of their collaboration as a typical independent 16mm film project first and pornography second. On a textual level, Soloway did not see much distinction between Poole’s work and that of Carolee Schneemann or Paul Morrissey, apart from the fact that *Boys in the Sand* and *Bijou* were more explicit.

Textual ambiguity, the threat of confiscation or prosecution, and a hypocritical approach to sexual politics continued at film labs through the 1990s. One of the timers at DuArt, who was a born-again Christian, refused to print M.M. Serra’s *L’Amour Fou* (1992) on religious grounds. The film is an experimental documentary about New York’s underground S&M scene, but despite its sex-positive orientation, the timer objected. Similarly, Luther Price’s *Me Gut No Dog Dog* (1995), which includes segments of gay pornography, was confiscated by a lab along with the less explicit *A* (1995), sent in for printing in the same box. The lab threatened to destroy the film, and Price had to beg to have it returned. Price has since ceased making prints of his films, exhibiting only his originals.

While it was rare for a lab to destroy a film, filmmakers had to be constantly vigilant.

Peggy Ahwesh and Keith Sanborn's *The Deadman* (1990) provides an example of some labs' capriciousness in regard to content. The film is an adaptation of Georges Bataille's short story "Le Mort." In the film's central section, a woman named Marie (played by filmmaker Jennifer Montgomery), naked except for a long trench coat, pees in the woods before fleeing from a rainstorm into a dingy bar. The bar is filled with farmboys in cowboy hats, including Pierrot, a good-looking James Dean type, and The Count, dressed in a suit and cape. Marie strips naked and dances around the room, drinking and cavorting until splayed out on the floor. She is manhandled before engaging in an aggressive sexual scenario, including urination, in which it becomes difficult to determine if the actions are pleasurable or degrading. Marie's actions are sexually charged and perhaps joyful, but they are not especially erotic, seductive, or even appealing in the way that viewers expect sexual images to be. Therefore, the film is incredibly provocative in its suggestion that Marie reclaims a feminist agency by comporting herself as a non-erotic sexual being.⁸⁸

Ahwesh and Sanborn had the film processed at Alpha Cine, a lab in Seattle used by many avant-garde filmmakers. Surprisingly, the lab prepared a timed workprint of the film without comment, but when it came time to make an answer print, the lab informed the filmmakers that the film was morally objectionable and could not be printed. Sanborn recalls:

Apparently the people on the day shift were Mormons, and the lab owner was known to be somewhat conservative. They let us know that they didn't like it, that it was not work that they felt comfortable printing. At that point, I was just praying that they didn't do some weird-ass shit and phone the Feds or destroy the negative because they're doing God's work. I wasn't going to argue the point, I just wanted the A-B rolls back.

Fortunately, Sanborn and Ahwesh were able to convince the lab to return the film, and they ultimately had it printed at Lablink, a New York-based lab. But their experience illustrates the precarity of entrusting a film with the lab, especially considering that the threat of confiscation

could depend upon the morality of the timer who happens to work the day shift. Alpha Cine's rejection of *The Deadman* is especially ironic considering that they also printed pornography as a side business, suggesting that the film's depiction of feminized sexual aggression was perhaps more difficult to reconcile than even mainstream pornography.

To return briefly to Schneemann's *Fuses*, the supposed shock experienced by the lab owners over their first encounter with feminist sexual politics did not deter them too much, as they worked closely with Schneemann to print the final 400 feet of the film, which was so heavily collaged that it would not run through the printer. At first, Gretina and Barone told Schneemann that her film was unprintable, which was so devastating to her that she threatened to drown herself in a vat of chemicals. The owners quickly reneged and agreed to optically rephotograph the final section frame-by-frame. "It was a tedious labor of very sweet devotion," Schneemann remembers fondly. "They were sweethearts." This kind of close working relationship with lab technicians was surprisingly common. The examples provided in this chapter demonstrate the range of procedures available to artists, but they fail to trace the vicissitudes of a single relationship between filmmaker and lab over the course of a career. Stan Brakhage's lifelong alliance with Western Cine illustrates the ways in which a lab can contribute to a filmmaker's aesthetic as it develops, year by year and film by film.

Stan Brakhage and Western Cine

Within the avant-garde, the most extensive long-term relationship between a filmmaker and a lab is that of Stan Brakhage with Western Cine, an association that spanned 50 years and over 300 films. Paradoxically, Brakhage is also considered the epitome of the self-sufficient artist, a solitary Romantic who traded in the camaraderie of the avant-garde filmmaking

communities in San Francisco and New York for artistic freedom in the mountains of Colorado. In fact, Brakhage worked closely with other artists, family members, and his lab to realize ambitious film projects that, if not always “collaborations,” were nonetheless dependent upon the technical assistance of others. Although he is best known for drawing creative inspiration from poetry, music, and myth, Brakhage was frequently motivated by the specificities of film technology, which he then had to negotiate with his lab. Moreover, Brakhage understood processing and printing to be vital stages of the filmmaking process in which creative choices and aesthetic judgments were made. In this section, examples of collaboration and antagonism between Brakhage and Western Cine demonstrate the extent to which Brakhage used the lab to turn technical constraints into possibilities, simultaneously in command of his work and subject to forces outside of his control. More broadly, they call attention to the complicated and precarious interactions between artist, film, lab, and technology in the creation of an artist’s film.

In an incredible instance of synchronicity, Brakhage’s career coincided almost identically with the lifespan of Western Cine. The lab, which in its earliest days was described by Brakhage as “a B. & W. processing machine & a printer in a basement,” was started by John Newell and Herman Urschel in 1952.⁸⁹ The same year, Brakhage shot his first film, *Interim*, under the viaducts of Denver. His cinematographer, a high-school friend named Stan Phillips, would later become the lab manager at Western Cine. At first, the lab could only process black-and-white 16mm reversal, but they continued to expand throughout the following decades, adding color processing, 8mm and 35mm, an optical department, and equipment rentals and sales. By 1959, they could boast that their “complete facilities” enabled them to “maintain control over all phases of film production from start to finish ... all under one roof.”⁹⁰ In the 1960s, Phillips also headed an in-house production unit that made industrial films and commercials for clients such as the

Colorado State Department of Public Health, the National Foundation for Asthmatic Children, Continental Airlines, and Blue Cross & Blue Shield.⁹¹

Due to their shared history, Brakhage remained loyal to Western Cine for his entire career. When he moved back to Colorado from New Jersey in 1960, his bond with the lab strengthened. In private and in print, he recommended their services to other filmmakers, championing their willingness to tackle unorthodox jobs. In the pages of *Film Culture*, Brakhage raved:

The policy of [Western Cine] for some 11 years now ... has consistently favored and encouraged experimentation in the film medium, allowing even controlled chemical experimentation in the processing (when desired)—something which would turn the hairs of the average lab technician white at the thought ... but then “thought,” in any form, usually does bleach commercial lab technicians to a pasty pale refusal of all future commitments. Western Cine, in turn, commits itself to the future... [The lab] not only pay[s] lip service to “experimentation,” but also act upon their beliefs even to the extent of helping the aforementioned film artists to feed themselves, families, and cameras, etc.⁹²

Brakhage’s effusive praise borders on the hyperbolic—especially considering the problems that he would have with Western Cine over the years—but he undoubtedly believed in their shared commitment to his work. An alliance with Brakhage was also beneficial for Western Cine; in addition to his prolificacy (which ensured them a steady stream of business), Brakhage was the most visible independent film artist in the country, a prestigious client for a regional lab that did not do much commercial work. At least for a time, their affiliation with Brakhage earned them a reputation for being friendly to avant-garde filmmakers, which led to jobs for artists such as Peter Kubelka (*Unsere Afrikareise*, 1966) and Gregory Markopoulos (*Twice a Man*, 1963 and *The Illiac Passion*, 1969).

Although Brakhage expressed a great deal of admiration for Western Cine, he partially attributed their mutual success to his ability to supervise the lab procedures directly. In a letter to Kenneth Anger, Brakhage noted that “I supervise almost everything, keep in constant touch with

them, etc.”⁹³ In practice, Brakhage did not typically travel to Denver to sit with the lab technicians while they timed or color graded his answer prints. For the most part, Stan and Jane Brakhage communicated with the lab through phone calls and letters, providing detailed instructions for a film at the answer print stage and verbal and written feedback after the work had been completed. In addition, Brakhage almost never made workprints, preferring to edit his original footage. Editing originals saved money, especially for a filmmaker as prolific as Brakhage, but, more tellingly, it had important ramifications for his working process. According to Brakhage: “I have this problem that when I work I put everything that I’ve got into it and if I were [editing] with the work print my nature is such that when I got to the original I would not be able to just match edge numbers, I would make another whole film. If I were able to make one at all.”⁹⁴

Brakhage’s level of involvement with the lab was an acknowledgment that their work was crucial in producing the subtlety that he valued in his films. In 1978, Brakhage sent a letter to John Newell in praise of a recent set of preservation internegatives for *Dog Star Man* (1961–64), which he declared to be “one of the finest printing jobs in the history of cinema.” Brakhage proceeded to highlight the work of each lab technician, explaining the value of his or her contributions to the film. For the timer, Crystal Rae Lanthorn, Brakhage writes, “Most of my work depends upon subtlety of light (almost ‘air splitting’); and it couldn’t really exist (as more than a shadow of itself) were it not for her extraordinary ability and patience.” In a later paragraph, Brakhage states even more explicitly his debt to the lab: “I only see George when he wanders out from under that haze of chemicals; but I know that if he mixes one batch wrong or lets one vat shift in temperature ... all is lost. I only see Lester when he comes in out of the dark; but I know that he holds the very life of a film, the original, in his careful hands—as do many

others whose names I've not yet learned.”⁹⁵

This letter is remarkable for several reasons. On a basic level, it demonstrates Brakhage's belief that his aesthetic is one of precision and nuance, which flies in the face of the common criticism that his idiosyncratic shooting and editing methods were haphazard and accidental.⁹⁶ More interestingly, Brakhage recognizes that his films succeed or fail in the printing, an element of the process over which he has little control. In his comments for Lanthorn and George, Brakhage calls attention to the precarity of his images, stressing that subtle contours of light would appear dull and flat if the processing and timing were not afforded rigorous attention. Of course, the statement that his films “couldn't really exist” without Lanthorn's careful timing acknowledges the degree to which Brakhage depended upon the lab for the delicate effects in his films, but it also creates a certain tension with regard to Brakhage's writing, in which light is often presented as axiomatic, an essence that constitutes both cinema and the world.⁹⁷ In this letter, light is characterized as something contingent that can only completely materialize with the proper amount of artfulness and finesse.

Despite his high praise, Brakhage's relationship with Western Cine went through rough patches, especially in the late 1970s and early 1980s. In 1979, the lab bungled the processing of precious footage shot on a trip to Alaska. Although some of the material would later be salvaged for *Creation* (1979), Brakhage was shocked to discover machine marks slashed across the frames at regular foot-long intervals.⁹⁸ A year later, Brakhage complained that “it is almost impossible to get anything thru Western Cine these days. Their standards have finally sunk along with everyone else's. This has been about the last straw and has broken me somewhat.” He further laments that his current film, *Sincerity IV* (1980), depends upon such subtlety of printing that the project has been completely curtailed by Western Cine's inability to deliver.⁹⁹ Later that year,

Brakhage mentioned that he was on the hunt for a new lab, but he conceded that he may “throw myself totally on the mercy of The Muse and my angels and (at least try to) accept whatever they/the lab produce out of chaos and prayer.”¹⁰⁰

Despite the ups and downs (which was typical in many of Brakhage’s personal and professional relationships), Western Cine valued Brakhage’s filmmaking and was willing to accommodate intricate or sensitive jobs. After having difficulty timing *Roman Numeral II* (1979), Lanthorn wrote to Brakhage: “I’m going to repeat this ‘II’ print AGAIN & AGAIN until it’s good... If you could stomach screening [a bad print of it] and letting me know if at least the color is right or close, I’ll be more than happy to RE-DO one more time.”¹⁰¹ It is worth noting that *Roman Numeral II* is a completely non-representational film, consisting mostly of fuzzy prismatic light clusters coming into and out of focus.¹⁰² The film itself provides very few cues or guidelines as to how its images are “supposed” to look, so Lanthorn’s task would have been especially daunting. But in addition to difficult timing jobs, Brakhage also occasionally made “lab films,” projects intended to involve Western Cine in the filmmaking process by amplifying or expanding their traditional role. While *Mothlight* and portions of *Dog Star Man* had their own sets of difficulties, the first film Brakhage designed with the lab’s capabilities in mind was *Scenes from Under Childhood* (1967–71), especially the second, third, and fourth sections.

As its title suggests, Brakhage intended *Scenes* to be a rumination on childhood, the period in which an individual’s formative visual experiences occur. Over several years, Brakhage filmed his own children in and around their cabin in Rollinsville. Through observation of their games and activities, memories of his own childhood are evoked, represented onscreen by photographs and other documentary footage. The film also sprang from Brakhage’s desire to destroy the myth that childhood is inherently innocent or pure—what he called “Shirley Temple

Syndrome”—and better understand children’s thought processes and experience of daily living.¹⁰³ Of course, for Brakhage, childhood is inextricably linked to phenomena such as “closed-eye vision,” the process of developing sight, and the memory of seeing as a child.

Over the course of almost 135 total minutes (split into four sections), domestic scenes such as the Brakhage children playing outside, Jane and Stan in bed, family car trips, Jane sobbing with her head on a pillow, and the girls draped in hooded robes are superimposed (sometimes in as many as four layers), pixilated, and subjected to slight shifts of tone and color. The images are combined in dizzying arrays of negative and positive, black-and-white and color, and punctuated by full-frame color fields that flicker with minute gradations of density. The overall effect is a repetitive dissolving into a hazy miasma, processes of memory and vision rising to the tip of consciousness and changing slightly in hue before being swallowed back into the void. Unlike other Brakhage films, editing was not the primary technique. Brakhage explained:

My drive throughout here was to take whole sections of shooting and lay them in relation to, and fortified by, superimposition of other material—either supportive in color or texture, or other whole series of shots that went with them—rather than to take the shooting as the material, and start breaking it up and all that extreme mentality or intellectuality of editing.¹⁰⁴

In other words, editing in the conventional sense (of shots being placed consecutively in accordance with formal or conceptual principles) was supplanted by “equivalent” techniques, such as multiple-roll printing and shifts in color and density. Although *Scenes* does have a great many splices, Brakhage’s primary method of organizing the material was to replace traditional editing strategies with lab procedures, using superimposition and light changes to invoke a sea of memory, color, and perception.

In realizing *Scenes*, Brakhage was aided by an unexpected financial windfall, technological developments at Western Cine, and changes in his own lab practices. In 1967, he was awarded a

Rockefeller Grant, which finally allowed him to replace his stolen 16mm equipment, as well as pay for more extensive printing. Meanwhile, Western Cine purchased a computerized printing machine that was capable of rapid light changes.¹⁰⁵ Around the same time, Brakhage started making internegatives of his films to save wear and tear on his originals when striking release prints. The aesthetic possibilities of changing the light in the printer seemed an exciting avenue to explore. As with so many other filmmaking techniques, Brakhage pushed this variable to the extreme, combining multiple-roll printing with an enormous number of light changes.¹⁰⁶

Brakhage called the process of making *Scenes* “an expensive madness,” in that he pushed lab technology beyond what the machines were designed to do.¹⁰⁷ In and of themselves, timing adjustments were not out of the ordinary. But the sheer number requested by Brakhage was staggering. Brakhage places it in context:

On the average, in a 45-minute film, no matter how many rolls are involved, they expect 50 light changes: this machine was designed to do several hundred. In the last 45-minute section of my film [*Section 4*] there are over 4,000. I had no idea when I started working into this that it couldn’t be done—I was just putting 4,000 presstabs in there with instructions on them. The only way to get the machine to work was to attach it to the air conditioning system to keep it from blowing out.¹⁰⁸

Furthermore, Brakhage’s printing became more complicated with each section of the film he completed:

<i>Section 2</i>	45 min.	2,700 light changes over A-B-C rolls
<i>Section 3</i>	30 min.	3,000 light changes over A-B-C-D rolls
<i>Section 4</i>	45 min.	4,000 light changes over A-B-C rolls ¹⁰⁹

The lab needed to work overtime to meet the demands of the film. According to Brakhage, the technicians worked in their “spare time” to save him from paying the full rates, affectionately dubbing the film the “Hundred Hour Timer” because it took over 100 hours simply to punch the tape for the light changes. After dropping off his materials at the lab, it took as long as three months for Brakhage to get a completed answer print of each section.¹¹⁰

Although timing has a tremendous influence on filmmaking aesthetics, it is not something that the viewer is expected to notice. In standard timing jobs, changing the light would be viewed as a corrective measure to provide the film with a unified look, but Brakhage includes so many light changes in *Scenes* that the process becomes one of the film's structuring elements. For example, in *Section 4*, a frenzy of shots of purple, orange, and blue flowers are intercut with and superimposed over images of the body of a naked child and one of the Brakhage girls crying. Suddenly, hazy blue color fields emerge out of the mélange; the fields change hue and density, morphing from blue to turquoise to pink. As the children play with colored towels, throbbing blank fields of turquoise and yellow combine in superimposition to create a flurry of color that seems to pulse from within because the light is changing so rapidly. In *Scenes*, there is a palpable sensation that the images are rising out of a foggy pool, not edited as much as conjured. This is the direct result of Brakhage's labyrinthine combination of colored leader with multiple-roll printing and dozens of light changes per minute.

Scenes from Under Childhood was originally intended to consist of at least five parts, but Brakhage had to abandon the project when the Rockefeller Grant ended. Even with his discount, such intensive timing jobs were costing Brakhage \$550 per month, an astronomical sum for his family. For awhile, Brakhage tried to finish *Section 5*, but his inability to afford the printing led to work blockage, so the project was declared completed in 1971.¹¹¹ Later, Brakhage estimated that the four sections of *Scenes* cost him between \$15,000 and \$20,000 in lab bills.¹¹²

Could *Scenes* be considered a collaboration with Western Cine? Brakhage did not exactly involve the lab in the creative aspect of the filmmaking process, nor were the effects that he requested especially unorthodox in and of themselves. More accurately, Brakhage was encouraging the lab to push one of their standard procedures to the brink of what was

technologically possible. Brakhage did, however, strongly depend upon the lab, as he never would have been able to realize the film without their cooperation and willingness to exhaust their new printer. (Brakhage later claimed that *Scenes* broke their machine, which needed to be sent back to the manufacturer.)¹¹³ More to the point, the timing in *Scenes* becomes a formal device that is tied to a very specific effect: the shifts of tone and color that dissolve into a haze, which for Brakhage signify the stream of vision, memory, and association that forms the backbone of childhood. Therefore, Brakhage's theoretical foundation for the film is tied to a set of lab procedures, which illustrates the fact that the more conceptual aspects of Brakhage's filmmaking were not always solely intellectual, but often tied to very particular uses of film technology.

Even with films that were not designed for the lab, Brakhage would anticipate the effects of the printing. Sometimes his requests for the lab techs were as simple as shifting a chemical tank at the end of the working day after other clients' jobs were finished to produce a desired "tone." In other cases, Brakhage's instructions were more specific. Consider the following two examples, which are worth quoting at length. For *Tortured Dust* (1984), Brakhage wrote to the lab:

The film ... is composed of VERY dark shots intermingled with some extremely light ones... The key message I can send to you IS: the muggy movements in the dark shots MUST be visible, even if it means the end of the previous shot, or the beginning of the following shot (or even the WHOLE previous or following shot) will be very much overexposed... The exception to this rule would be any dark shot which is primarily, or only, a glaring bright light, or reflection of same, which is so brief-a-shot that that effect is all that would be visible ANYway.¹¹⁴

Other instructions were even more involved. For *Nodes* (1981), a handpainted film, Brakhage suggested:

You might shut all printer-light off for the dark (black leader) spaces between hand-painted pictures; but IF you do this, please leave the first spate of black leader

between pictures 1 & 2, after head title, visible (as there is a gray smudge across several frames of it which I fancy and wish to have remain in the film; and you MUST print all the single-perf leaders (starting about mid-point of the film) as they are composed of various subtle colors which I wish to appear between painted sections (the first one a single frame), and please give some thought to the amount of light for these single-perf leaders, as I wish them to print as close to the color of the original and, thus, to remain SUBTLE, as they are, hints of tone between the brilliantly painted-color frames.¹¹⁵

While these lengthy excerpts may seem overly technical, they shed a good deal of light on Brakhage's working process and relationship with the lab. In the *Tortured Dust* example, Brakhage notes that he has created a challenge for the printer by cutting together very dark shots with extremely light ones. The problem is that the shutter on the printer can only adjust so quickly, especially if the shots are short, making such dramatic oscillations difficult to render precisely. In his instructions, Brakhage indicates that he has considered this problem and has devised a compensatory plan: the timer should prioritize the "muggy movements" in the darker shots by hitting them with enough light that they are visible, even at the expense of overexposing the shots that immediately follow. That is, Brakhage is aware that he has created a very difficult timing job and has built in a hierarchical system of rules to ensure that the timer knows which aspects of the shots to privilege.

More revealing is the *Nodes* example. In this film, handpainted sections are separated by two kinds of leader: a black "double perf" and a variety of subtly colored "single perfs," and Brakhage wants them timed differently to achieve a desired effect. He suggests that the timer consider shutting off the printer light for the black "double perf," which would result in a very stark transition from leader to painting, with the deep blacks refreshing the retina between bursts of ecstatic color. But more importantly, Brakhage insists that the slight colors on the "single perfs" need to be timed, because he wants them to linger on the retina, subtly "toning" the transitions from leader to paint. Motivated by theories of "closed-eye vision," Brakhage

considered the role of leader in informing the viewer's experience of the handpainted sections and concluded that the different types of leader needed to be timed according to their own specifications. To be clear, the fact that Brakhage prepared these instructions for the lab is not remarkable in itself; many filmmakers gave the lab directions for timing their films. The important point is that Brakhage's interactions with the lab suggest that he incorporated the particularities of the technology into his process, even anticipating subtleties like the effects of leader density on the images that surround it.

Brakhage's relationship with Western Cine entered a new phase with his increased commitment to handpainting in the 1980s and 1990s. While Brakhage had painted sections of his films before, including *Thigh Line Lyre Triangular* (1961), *Dog Star Man*, *Eye Myth* (1967), and *Skein* (1974), several factors encouraged him to immerse himself more fully in the practice. The initial impulse was his inability to afford the printing of his films, which reached a crisis point with his *Arabic Numeral Series* (1981–82). In debt, Brakhage stockpiled his unprocessed rolls, hoping to raise funds. Although all of his films were eventually printed, including longer pieces such as *The Arabics*, *Tortured Dust*, *The Loom* (1986), and *Faustfilm* (1987–88), Brakhage complained frequently about money. "Something spooky about making film and not even being able to see it yourself on a projector," Brakhage wrote to Bruce Baillie. "Maybe we'll all be reduced to leaving unprocessed rolls to posterity. Maybe it is flip-card time. I dunno."¹¹⁶ In 1983, Brakhage painted a one-minute film, *Hell Spit Flexion*, on a release print of an earlier 35mm film, *The Garden of Earthly Delights* (1981). It took him a year and a half.

Ironically, handpainting film was supposed to reduce Brakhage's dependency on the lab. Upon completing *Hell Spit Flexion*, Brakhage's desire to paint on 70mm stock intensified. He dreamed of painting a 70mm mural that would stand as his last testament, a film that he would

never be able to print or screen. He wrote to Baillie:

One of my fondest dreams, these days, is just to spend the rest of my life hand-painting a 70 mm strip of film dug, say, out of [George] Lucas' trash ... and spend the rest of my life slowly painting it over a HUGE (to me) frame at a time until I die (to make a "mural" thus as my last testament — a film I'd NEVER be able to print ... nor have any reason, as there'd be no way to show it — an epic hand-painted work, free of the lab on the one hand and of any audience on t'other)... At a time when many can't afford to work even in 16mm or 8mm, I've found an absolutely costless way to move on up to 35mm and 70mm.¹¹⁷

Given the institutional structure of avant-garde cinema, the idea that Brakhage could work in 70mm and show his film to audiences seemed farfetched. He told Baillie that he considered the process of handpainting to be solitary, monk-like behavior, his way of quietly fading away like General MacArthur.¹¹⁸ In 1984, friends and colleagues, including Alexander Hammid, were able to procure some 70mm stock for Brakhage, on which he began a film entitled *existence is song*.¹¹⁹ Shortly thereafter, a friend at the Academy Film Archive found some 70mm Cinemascope stock and sent it to Brakhage, affixing the message: "You can turn our junk into art anytime you want."¹²⁰ Brakhage used this stock for a "side project" film to be called *Purgation*.

Brakhage worked on *existence is song* and *Purgation* concurrently, conceiving of them as reflections upon each other in the manner of William Blake's *Songs of Innocence* and *Songs of Experience*. He devised a new method for handpainting film, using his fingers to smear the paint over the filmstrip.¹²¹ By 1985, Brakhage had decided that all of his recent handpainted films were related, part of a single work based on Dante that he called *The Dante Quartet* (1987). While Brakhage remained adamant that he would spend the rest of his life painting the film without printing or screening it, he nonetheless entertained ideas about how to preserve it: Jane suggested using a 70mm camera to record some of the frames as still images, and Western Cine made a 16mm reduction print of a 45-second excerpt for a TV special, which Brakhage dismissed as reducing the Sistine Chapel to postcard size. He continued to insist that the only

way to experience his new work would be to see it on a lightbox.¹²²

By 1986, Brakhage seemed to have changed his mind about printing *The Dante Quartet*, and the results of this endeavor would lead to a new working relationship with Western Cine. Brakhage's earlier attitude, that his painted film would be stockpiled in his basement "with careful printing instructions for the first non-terrestrial who comes along and finds the ruins of my log cabin," changed after his divorce from Jane and his receipt of a prestigious monetary award from the American Film Institute.¹²³ Within a week of the check clearing the bank, Brakhage drove to Western Cine with about \$4,000 worth of printing, some of which was handpainted. In addition to printing short handpainted loops that were made for The Sunday Associates, a Boulder art collective (*Fireloop* (1987) and *Loud Visual Noises* (1987)), Brakhage hired Dan Yanofsky of Western Cine to optically rephotograph some shorter films made with leftover 70mm stock, *Night Music* (1986) and *Rage Net* (1986). Six years after he began, Brakhage's pipe dream of seeing *The Dante Quartet* on the big screen was realized; with the addition of a new section, *Hell Itself*, Yanofsky reduced the film to 16mm and 35mm versions.

Yanofsky's work on *The Dante Quartet*, which also included step printing (or slowing down) some of the sections to vary the rhythm, opened up Brakhage to the possibilities of optical rephotography of his painted work. Instead of scrambling for 70mm stock and paying for optical reduction, however, Brakhage adapted his method to 16mm. While the painting itself was relatively straightforward—Brakhage worked in his office or in cafés in Boulder, carrying his stock and paints with him in a bag—the printing involved a set of new procedures and relationships with the lab. These were outlined by Brakhage in handwritten and verbal instructions for Western Cine's optical printing technician, Sam Bush. The early-to-mid 1990s witnessed a series of Bush's jobs for Brakhage that were often acknowledged as collaborations.

In addition to step printing at 2:1 or 3:1 (that is, copying two or three frames for every one frame of original), Bush added other sets of procedures to Brakhage's arsenal.

Brakhage made extensive use of Bush's optical printing in *Delicacies of Molten Horror Synapse* (1991), for which many of these techniques were first established. The film was inspired by Brakhage's hatred of luminescent lighting, particularly as emanating from a television screen, which he believed disrupted the natural flow of hypnagogic vision. This inspired Brakhage to superimpose images shot off a TV with a 13-second handpainted loop, so that a very rhythmic section of visual music was brought into violent conflict with flat television imagery. Essentially, the loop was printed over and over again in different permutations—sometimes Bush printed it upside down or backwards, other times reversed in orientation from right-to-left or left-to-right. This ensured that a relatively small amount of painted original would yield an almost infinite variety of shapes and forms. Over the course of the film, the shapes build up to be increasingly symmetrical before finally breaking down into a multiplicity of points of focus and subtle shifts from one color to the next.¹²⁴

Throughout the 1990s, handpainted films constituted the bulk of Brakhage's output.¹²⁵ Some of these were relatively free of optical effects, apart from some instances of step printing. *The Prelude Series* (1996), for instance, relies almost entirely on the painting itself without any additional manipulation. In many other cases, however, Brakhage collaborated closely with Bush, providing detailed instructions for optical printing to be carried out in his absence. In *Stellar* (1993), painted frames are superimposed and held as nearly static images, interspersed with dramatic fades to black. In *Cannot Exist* (1994), optical zooms combined with superimposition makes it seem as if the viewer is plunging into a parallax of overlapping canvases. *Paranoia Corridor* (1995) consists more of optical effects than actual handpainting.

Additionally, many of the films are composed of permutations of handpainted loops, using variations in printing to multiply and diversify the amount of original footage. Ironically, Western Cine's capabilities encouraged Brakhage to incorporate optical printing into his practice late in his career, despite the fact that it was one of the few techniques that he did not pursue very adamantly in earlier decades.

While it is commonplace to conceive of Brakhage as singularly responsible for all of the elements of his films, his work with Western Cine suggests that he frequently allowed for controlled collaboration and, in some cases, built these collaborative elements into the designs of the films. But it is unnecessary to posit Western Cine as a collaborator in the fullest sense of the term to acknowledge that film technology was an essential component of Brakhage's working process, as much as more theoretical ideas about perception, vision, or consciousness. When his lab acquired the capability to perform thousands of light changes, Brakhage designed a film in which variations in timing would be an important formal component. When working with dramatic fluctuations of light and dark, Brakhage anticipated the subtleties of the lab work and devised a system to accommodate them. When painting the filmstrip, Brakhage appreciated that loop printing and optical effects could expand his artistic palette. In all of these cases, these procedures become structuring elements of the films, as important to his aesthetic as the gestural camera or rapid editing.

Although Brakhage factored lab procedures into some of his films, he did not use them reflexively. That is, Brakhage would use the lab to achieve particular effects, not to interrogate its role in the filmmaking process or direct the viewer to an overlooked aspect of the cinematic experience. Other filmmakers, especially those affiliated with the Structural tradition, were more interested in systematically pursuing a lab process to highlight the ways in which it determined

the film's images. This more emphatically medium-specific use of the lab is evident in Morgan Fisher's *Cue Rolls* and J.J. Murphy's *Print Generation*, which posit the lab's partial responsibility for the images as their subject.

Lab Films: *Cue Rolls* and *Print Generation*

At first glance, *Cue Rolls*'s minimalist presentationalism and pedagogical overtones make it seem peculiarly straightforward, an impression that proves to be deceiving. The entirety of the film consists of a (seemingly) continuous five-minute overhead shot of a 4 Gang 16mm film synchronizer, a device used to hold four rolls of film together for frame-by-frame correspondence.¹²⁶ Four rolls of leader (A, B, C, and D) run through the synchronizer. The rolls are made up of black leader, but there is a segment of white leader that alternates rolls from left-to-right in a regular pattern, so the viewer is always seeing three rolls of black and one roll of white at any given moment. The only other movement in the frame derives from the turning over of the synchronizer and the steadily ticking footage counter.

In language reminiscent of a technical manual, Morgan Fisher's voice-over explains that the rolls of leader correspond to the film that we are actually watching. The white leader, which has been distributed in ten-foot sections across the four rolls, represents the portion of the roll corresponding to the printing element, i.e. where the picture is occurring. Each cycle is 40 feet long and repeats a total of five times, which accounts for the film's 200-foot, nearly six-minute runtime. In other words, *Cue Rolls* has been A-B-C-D rolled in accordance with a mathematical pattern, broken down into separate pieces of film only to be restored through rearrangement and printing. The leader on the synchronizer provides a visual analogue for this process: because the speed of the synchronizer is identical to the camera speed, the viewer sees a schematic

representation of the film itself in real time.

On the soundtrack, Fisher details the technical procedures that were used in the film's making, narrating the process in a dry, instructional tone. He explains multiple-roll printing and the discontinuities that would result from printing only one of the four rolls. He then points out that the frames at both ends of the shots were mutilated in the process of cement splicing (which was unavoidable in editing 16mm), so two internegatives, one for the A and C rolls, the other for the B and D rolls, had to be made to hide the splices and restore the continuity of the original material. He mentions that the timing and color correction will be uniform for all of the segments, so, "in the laboratory's view, the printing rolls will contain twenty separate shots, which are all to be treated the same way." Although cue rolls are normally used for light changes and effects, Fisher explains, the cue rolls in this film were prepared for the purpose of showing the negative cutter where to begin and end each segment.

For a casual viewer who lacks an intimate knowledge of lab procedures, the intricacies of Fisher's voice-over can be difficult to follow. But it remains abundantly clear that *Cue Rolls* is an ingenious film in the Structural tradition, highlighting an important aspect of cinematic specificity while narrating its own becoming. As is sometimes the case with Structural Films, the film at first seems impersonal, with the mechanical, gridlike presentation of the synchronizer suggesting a technical drawing.¹²⁷ It also dramatizes aspects of filmmaking that the viewer does not normally see, reminding us that filmic images are derived from physical objects, material processes, and chemical procedures. *Cue Rolls* is also elegantly labyrinthine, existing in a kind of paradoxical present. Fisher's voice-over alludes to technical operations to be performed in the future, but for the viewer, these operations have become past. For instance, Fisher states that the film is a guide for the negative cutter, "a record of the pattern, or model, which will be followed

to prepare the printing rolls from which the projection print will be made.” But, of course, the viewer can only experience the film by seeing one of those projection prints, which produces the knowledge that, based on the visual evidence, the negative cutter must have done his or her job correctly. Thus, the film is its own reason for being, both a pre-production document and the document itself.

For those with an understanding of lab practices, however, Fisher’s film is a hilarious, almost cosmic joke. And like many of the best jokes, the humor, which is derived from what Fisher calls “the proliferation of the unnecessary,” is profound in its implications.¹²⁸ In theory, the procedures that Fisher describes in *Cue Rolls* would be unnecessary for the film that we are watching. The film came out of the camera as a single continuous shot, so the logical process would be to add the soundtrack and titles, make a one-lite internegative, and strike the projection prints—as far as lab jobs go, a six-minute, single-take film is about as easy as it gets. But Fisher has needlessly complicated the process by cutting his film into twenty pieces and dispersing them across multiple rolls of film. Fisher then “exaggerates the perversity” by distributing the shots across four rolls of film when two would be sufficient, “twice the number that is needed to do something that seemingly isn’t necessary in the first place.”¹²⁹

This simple action initiates an avalanche of compensatory measures. If Fisher were to cut his camera original, he would be unable to restore the continuity of the shot due to losing frames to cement splicing, so he must make intermediate rolls. Now he must work with a negative cutter, for whom he will need to provide cue rolls. While ostensibly the subject of the film, this is a superfluity of his own making. Therefore, Fisher’s explanation, cited above, that “in the laboratory’s view, the printing rolls will contain twenty separate shots, which are all to be treated the same way,” can be taken ironically as both necessary and redundant.

But *Cue Rolls* is not simply an in-joke for laboratory workers and filmmakers. In fact, Fisher reveals a fundamental truth about process-based film work, framing it as a rabbit hole of technical decisions intended to mask the effects of other decisions, even for the simplest, unassuming film. Because Fisher chose to A-B-C-D roll his single-shot film, he needs to add 200 feet of black leader (spread across the rolls), plus use a synchronizer to line up the rolls for printing. Additionally, his decision to cut the film has necessitated two separate internegatives printed from the camera original (which the lab will need to develop one after the other to make as identical as possible), so that a third party, the negative cutter, can match it. But the negative cutter will need a guide, so Fisher has been forced to prepare the cue rolls that serve as the subject of the film itself. Of course, most viewers have some awareness that a series of technical decisions have conspired to produce the film that they are watching, but this knowledge is often lost in the seamless immediacy of projection. So in one sense, Fisher is unmasking an important part of the filmmaking process that few people see.

In another sense, however, Fisher is making a larger point about illusionism in the movies, complicating his own process to highlight the material reality that commercial films conceal. This idea is instantiated in the perceptibility of the cuts. As Fisher attests in his voice-over: “The mechanical fact of the splices passing through the printer might cause a jump or irregularity in what might otherwise appear to be a continuous shot. Ordinarily, the jump is never noticed because the change from one scene to another eclipses it.” *Cue Rolls*, of course, began its life as a continuous shot, so a jump would be noticed. Moreover, the film cues the viewer to the presence of the cuts, which occur exactly when the white leader hits the center of the synchronizer. Yet although Fisher insists that the cuts are visible, I must confess that they do not completely register for me. I share this personal experience of the film to point out that one can

watch *Cue Rolls* and perceive no visual indication that anything Fisher is describing actually happened. This can produce a cognitive dissonance between the reality of the film that we are seeing and the reality of its production as it is being recounted. Since it is difficult to imagine that the film is anything but a single, continuous shot, it takes a leap of faith to believe that it is actually twenty, and that its appearance is the result of an intricate series of processes designed to make it seem fluid. We take Fisher's word for it, as we must with all movies: we deny what we know to be the truth, Fisher seems to suggest, and take the film's word for it.

For *Cue Rolls*, Fisher worked with Consolidated Film Industries, a lab in Los Angeles that catered to Hollywood, although by 1974, they were mainly providing opticals and projection prints for exploitation films such as *Black Belt Jones* (1973) and *Gone in 60 Seconds* (1974).¹³⁰ C.F.I. did not have a problem with Fisher's hyperbolic complication of lab procedure, although one of the technicians joked that Fisher was going to want the lab to process his next film in sheep dip.¹³¹ Earlier in this chapter, Fisher explained his unassuming relationship with labs. He expands:

I have never felt that a lab was hostile to my kind of work. To me it wasn't a question of their collaborating with me, they were simply performing the services that they were in business to provide. And I didn't feel that it was reasonable to expect them to take an interest in the work I was bringing to them, that is, to take any greater interest in my work than in the work of any other customer... But in saying this I also mention that I never made any requests, let alone demands, that I would call in the least out of the ordinary.¹³²

This statement is revealing in terms of *Cue Rolls* because it suggests the degree to which the film is idiosyncratic in concept but ordinary in execution. Taken in isolation, all of the procedures used in making the film, while unnecessary, were extremely routine: processing, multiple-roll printing, timing, negative cutting, and adding a soundtrack were all common elements of 16mm film production. The fact that *Cue Rolls* makes these procedures its subject by multiplying them

beyond necessity is, of course, highly unusual. Therefore, the film uses atypicality to emphasize that which is so typical as to be ubiquitous, the components of nearly every film. This quality of standard procedure put to idiosyncratic uses is similar to Fisher's relationship with the lab, in which he was both offbeat personal filmmaker and any other customer.

The same tension between routine and excess animates J.J. Murphy's *Print Generation*, described by its maker as "the ultimate laboratory film."¹³³ Murphy's previous films can be understood as answers to questions posed by the filmmaker about his medium, with the results serving as illuminating and sometimes ironic dramatizations of the process. *Highway Landscape* (1972), a six-and-a-half-minute take of a dead animal on the side of a two-lane highway, was generated by the idea that potential films are everywhere, but they only become films when framed and recorded. So, would it be possible to turn something into a film using only composition and sound? In *Sky Blue Water Light Sign* (1972), another long take of a landscape that only gradually becomes identifiable as an animated sign for Hamm's Beer, the question seems to be: Can the phenomenological cues (light on a screen, relative scale of objects in the frame, figure and camera movement) through which we experience moving images be trusted, and how does the medium manipulate or transform these cues? "I felt it was important to understand the medium in which I was working," Murphy explains. "I needed to demystify it on some level. Otherwise it seemed as if I was dealing with magic."¹³⁴

In this regard, *Print Generation* can be seen as an attempt to demystify the lab process by engaging the technicians in a creative endeavor. The question Murphy asks is rooted in one of the most fundamental lab procedures: contact printing. In contact printing, it was inevitable that a loss in image resolution would occur when a film was copied, especially in 16mm. In graduate school, Murphy worked as a projectionist, and he began to notice that the prints rented for

classroom screenings were often of poor quality. Because he projected the films for multiple classes and saw them repeatedly, Murphy began to wonder how many generations away from the original certain prints were, and if it would be possible to break images apart in such a way that he could systematically trace their degradation in stages. This led to the most complicated filmic question that Murphy had yet posed: What would happen to the image if one made a copy of a copy of a copy?

The result is as surprising as it is inevitable. Murphy filmed 60 diaristic images of his life in Vermont and New Jersey and edited them into a one-minute reel, with each shot lasting exactly one second. He then ordered the lab to print fifty generations of the loop, until most of the image content had disappeared, leaving in its place swirling red emulsion grains against a black background. Murphy then separated the even and odd numbered generations so that the first half of the film moves from the most degraded images to the most pristine, while the second half reverses the process. Some of Murphy's images, such as a baby running in grass, a man sawing a log, and the frame structure of a house, are highly recognizable, so they become legible earlier in the process. Other images, such as wooden slats or reflections in windows, are less immediately identifiable, and only become legible near the film's center. A smaller handful, including a toothy ceramic sculpture and jars arranged in a shop window, are ambiguous enough that they prove difficult to comprehend even in their original iteration. On the soundtrack, Murphy recorded one minute of ocean sounds on a tape recorder and submitted the tape to the same process as the film, which he affixed to the images in the opposite configuration, so that the ocean sounds begin at their most recognizable, gradually become more indistinct, and then return to normal.

Scott MacDonald and James Peterson have written exhaustive appreciations of *Print*

Generation, skillfully elucidating the duality of cognition and memory that structures the film. For the first ten cycles or so, *Print Generation* is nearly abstract. Eventually, the edits clarify that the dot patterns are repeating. Soon, some of these patterns begin to coalesce into images. Once the conceit becomes apparent, the viewer tries to predict the content of the images, and since details accumulate at different rates, he or she uses known quantities to try to identify unknowns. The second half of *Print Generation* switches from cognition to memory, as viewers struggle to hold onto their identifications as the images begin to dissolve. This turns out to be surprisingly difficult; as the film reverts back to abstraction, some images fade from memory rather quickly, and much of the mental energy expended in the first section is lost. In addition, both commentators contextualize *Print Generation* in relation to Structural Film, noting the ways that it alternately resembles and undercuts films such as *Wavelength* (1967) and *Zorns Lemma* (1970).¹³⁵

From the beginning, Murphy considered *Print Generation* to be a collaboration with the lab. His earlier films entailed little lab interaction, and he found that labs could be intimidating and somewhat forbidding. He recalls: “The lab was performing a paid service. Everything occurred out of sight and behind closed doors. The attitude of most labs at the time was that they were the professionals, the technicians, and you were dependent on their expertise... On some level, I wanted to break through all that and engage the laboratory as a creative part of the process.”¹³⁶ This proved to be somewhat challenging. Murphy was teaching in Houston, and the only lab nearby had virtually no context for avant-garde cinema, so he needed to painstakingly explain the intent of the project to the lab technicians, who thought he was “a very strange person at first—they had all these little jokes about me.”¹³⁷ Because it was only cost effective for the lab to print Murphy’s one-minute reel each time they did a run, it took nearly six months for the film

to be finished, as they would often forget to include it in the day's printing.

Like *Cue Rolls*, *Print Generation* could be said to traffic in a kind of ironic profundity, a hyperbolic absurdism that becomes philosophical in its implications. In the case of *Print Generation*, the joke is that lab technicians were trained to maintain image quality to the extent that their jobs consisted almost entirely of processing and printing films so that their customers, whether filmmakers or businesses, were satisfied. But Murphy was asking them to do precisely the opposite—to ignore their reason for being and let the image quality degrade. From the standpoint of an avant-garde film enthusiast, the film's pointillism is undeniably beautiful, but from the vantage point of someone whose job it is to avoid such problems, it appears to be a failure. Therefore, Murphy's subversion of the labs as gatekeepers of the image meant convincing the technicians to abandon their traditional ways of thinking about how a film should look. To their credit, the employees at the lab became more curious about *Print Generation* as the process evolved and even came to like the finished product.

But *Print Generation* is more than a collaboration with the lab; it also allows lab procedure to dictate certain elements of its structure. Contact printing alternates winds, that is, produces a mirror image, so screen direction is reversed from one print to the next. Although this is not apparent in projection, different winds will produce different points of focus, which made it impossible for Murphy to cut successive generations together without losing focus in every other shot. This led him to organize the film into sections of A-wind and B-wind, so that an obscure technicality of lab procedure becomes the film's organizing principle. Of course, this also allows for the film's symmetrical structure. Like *Wavelength*, which is often misdescribed as a continuous 45-minute zoom, *Print Generation* is sometimes said to present one generation after another, when in fact each iteration of footage skips a generation. Laid out schematically, in

which the numbers represent the generations, the film's visual structure is:

First half:

49-47-45-43-41-39-37-35-33-31-29-27-25-23-21-19-17-15-13-11-9-7-5-3-1-“A-wind”

Second half:

2-4-6-8-10-12-14-16-18-20-22-24-26-28-30-32-34-36-38-40-42-44-46-48-50-“B-wind”

Therefore, *Print Generation*'s structure is a weave that rises and falls, not a linear progression.

Ultimately, one of *Print Generation*'s most enduring qualities is its transformation of a routine lab procedure into a nearly inexhaustible metaphor for some of life's most penetrating realities. In many respects, the film recalls Borges's famous adage: “Nothing is built on stone; all is built on sand, but we must build as if the sand were stone.”¹³⁸ By breaking the emulsion down into particles, the film shifts into the realm of the metaphysical. The emulsion grains skate around the frame, becoming more and more pronounced, as if building to something. Then, there is a great dispersal, as though entropy has somehow released the images from the bonds of physical reality. The film can also be read as a profoundly moving evocation of the inevitable dissolution of all things. In nearly every facet of life, there is build-up, momentum, energy exerted in pursuit of a goal or outcome. And then the fruits of this labor slowly begin to erode, decay, and fade into memory.

Conclusion

Film labs themselves were hardly immune to this inevitability. In 2014, the Academy of Motion Picture Arts and Sciences awarded an honorary Oscar “to all those who built and operated film laboratories,” an honor that doubled as a eulogy. In the early 2000s, hundreds of labs closed their doors, as digital technology virtually eliminated film as a distribution and exhibition medium. For many avant-garde filmmakers, working with the lab as part of the filmmaking process is now less pronounced. In the words of Jeanne Liotta, “The lab is like folk

art now, the old craftsmen and occasionally craftswomen doing their jobs.”¹³⁹ This was a significant shift in that the services performed by film labs—processing, work and answer printing, timing and color correction, and multiple-roll printing—were not just technicalities or incidentals, but often primary determinants in the realization of the films. As sites of contingency and collaboration, hostility and reciprocity, the labs represented an important node in the “art world” of avant-garde filmmaking.

Moreover, filmmakers’ relationships with labs reveal the technological sophistication at the core of the avant-garde filmmaking enterprise. In the dialectic between control and its relinquishment, film labs provide a material correlate for the theoretical debate between amateurism and professionalism that continually reappears in avant-garde film discourse. The history of professional film labs reveals the connections between the avant-garde and other non-Hollywood, 16mm reversal-based modes, such as television news and amateur cinema. Moreover, the unlikely convergence of the avant-garde with pornography sheds new light on the censorship controversies that have both plagued and electrified the avant-garde throughout its history. Stan Brakhage’s working relationship with Western Cine suggests the ways in which even the most self-possessed filmmakers depend upon the lab, sometimes designing films with the labs’ contributions in mind. And *Cue Rolls* and *Print Generation* provide examples of films that draw inspiration from the lab process to poignantly examine life’s contingencies and inexorabilities.

Construed broadly, some of the services provided by labs, including color correction and superimpositions from multiple-roll printing, could be called “effects,” or at least, superadditions to the profilmic image. As we have seen, some of these contingencies were out of the filmmaker’s control, which made the labs sites of negotiation that needed to be navigated. The

optical printer, on the other hand, also provided a method for reworking film, but in this instance, filmmakers coopted a commercial technology, bringing it into line with more radical formal and conceptual paradigms. In the following chapter, I detail the history of low-budget optical printing in the avant-garde to examine more intensive perceptual transformation of the image through rephotography.

¹ Anger describes his lab problems in Letter from Kenneth Anger to Stan Brakhage, 6/29/72, James Stanley Brakhage Collection, Bx 2, Fd 2, Special Collections and Archives, University of Colorado Boulder Archives. The quote derives from Letter from Kenneth Anger to Stan Brakhage, 11/24/72, James Stanley Brakhage Collection, Bx 2, Fd 2, Special Collections and Archives, University of Colorado Boulder Archives.

² Exceptions include two recent articles on artist-run film labs: Pip Chodorov, "The Artist-Run Film Labs," *Millennium Film Journal* 60 (Fall 2014): 28–36; and Genevieve Yue, "Kitchen-Sink Cinema: Artist-Run Film Laboratories," *Film Comment* (blog), March 15, 2015, <http://www.filmcomment.com/entry/artist-run-film-laboratories/>. See also Genevieve Yue, "The China Girl on the Margins of Film," *October* 153 (Summer 2015): 96–116.

³ Variations on this basic procedure are outlined in Steven Ascher and Edward Pincus, *The Filmmaker's Handbook: A Comprehensive Guide for the Digital Age*, 2nd ed. (New York: Plume, 1999), 472–509. (Note that most of the information about labs has been modified or dropped in subsequent editions.) See also Kris Malkiewicz, *Cinematography*, rev. ed. (New York: Van Nostrand Reinhold Company, 1973), 145–173; and Lenny Lipton, *Independent Filmmaking* (San Francisco: Straight Arrow Books, 1972), 343–375.

⁴ To be fair, this is not an argument made by a specific scholar, but a set of assumptions that inform a more general notion of the avant-garde filmmaker. The articles and books that have contributed to this set of assumptions are all richer and more valuable than the distillation of some of their principles might suggest. Some important sources are Sheldon Renan, *An Introduction to the American Underground Film* (New York: E.P. Dutton & Co., Inc., 1967), David Curtis, *Experimental Cinema* (New York: Universe Books, 1971), P. Adams Sitney, *Visionary Film: The American Avant-Garde 1943–2000*, 3rd ed. (Oxford and New York: Oxford University Press, 2002), and A.L. Rees, *A History of Experimental Film and Video* (London: BFI, 1999). In addition to scholarship, some avant-garde films seem to reinforce this idea—consider the portrait of the artist in Stan Brakhage's *Dog Star Man* (1961–64) or the imagination of the avant-garde as a community of spiritually minded filmmakers in Jonas Mekas's *Lost Lost Lost* (1976).

⁵ Lewis Klahr, telephone conversation with the author, March 24, 2015. All of the information about the production of *Engram Sepals* stems from this exchange.

⁶ Howard S. Becker, *Art Worlds* (Berkeley, Los Angeles, and London: University of California Press, 1982).

⁷ Janie Geiser, telephone conversation with the author, March 24, 2015.

⁸ David Bordwell, Janet Staiger, and Kristin Thompson, *The Classical Hollywood Cinema: Film Style & Mode of Production to 1960* (New York: Columbia University Press, 1985), 287.

⁹ G.M. Best and F.R. Gage, "A Modern Studio Laboratory," *Journal of the Society of Motion Picture Engineers* 35.3 (September 1940): 294. For a detailed description of a studio lab, see

William Stull, "Fred Gage Creates Great Lab at Warners' Burbank Studio," *American Cinematographer* 19.3 (March 1938): 96, 105–6.

¹⁰ For an illustrated history of Technicolor's early years, see James Layton and David Pierce, *The Dawn of Technicolor 1915–1935* (Rochester: George Eastman House, 2015). For Technicolor aesthetics, see Scott Higgins, *Harnessing the Technicolor Rainbow: Color Design in the 1930s* (Austin: University of Texas Press, 2007).

¹¹ Patricia R. Zimmermann, *Reel Families: A Social History of Amateur Film* (Bloomington and Indianapolis: Indiana University Press, 1995); and Charles Tepperman, *Amateur Cinema: The Rise of North American Moviemaking, 1923–1960* (Oakland: University of California Press, 2015). On the development of 16mm reversal, see Alan Kattelle, *Home Movies: A History of the American Industry, 1897–1979* (Nashua, NH: Transition Publishing, 2000), 80–85.

¹² Unfortunately, very little academic work has been done on these smaller labs/production companies. The most valuable sources of information have been compiled by industrial film enthusiasts or family members and can be found online. The history of Calvin Productions is detailed on its Wikipedia page, and a sizable portion of their industrials were recently acquired by the Prelinger Archive. Some information about Filmack Studios, which produced the immortal "Let's All Go to the Lobby" trailer in 1953, can be found in John Owens, "Timeless 'Let's All Go to the Lobby' Has Deep Local Roots," *Chicago Tribune*, January 24, 2013, <http://www.chicagotribune.com/entertainment/movies/ct-mov-0125-filmack-snipes-20130125-story.html/>. The history of Jamieson Film Company is best served by the informational page at the Texas Archive of the Moving Image, which houses its papers: <http://texasarchive.org/library/index.php?title=HollywoodOfTexas/>.

¹³ "Reduction Printers Installed," *The Film Daily*, November 19, 1926: 2.

¹⁴ Dr. Walter Clark, "Following Your Film Through," *Movie Makers* 13.11 (November 1938): 537, 555–58. By the mid-1930s, Kodak had over fifty processing stations around the world. See also "Leaders and Trailers," *Movie Makers* 28.9 (September 1953): 234, 243. On processing Kodachrome, see Harris B. Tuttle, "The Magic of Kodachrome," *Movie Makers* 12.12 (December 1937): 608–610.

¹⁵ See Tepperman for the definitive account of the advanced amateur movement. Kattelle provides a staggering amount of information about amateur film technology, although he neglects to discuss commercial lab procedures.

¹⁶ Linda Lynton, "Du Art Labs: Important Part of Indy Survival," *American Cinematographer* 67.11 (November 1986): 43.

¹⁷ Mike Conway, *The Origins of Television News in America: The Visualizers of CBS in the 1940s* (New York: Peter Lang Publishing, Inc., 2009), 180.

¹⁸ Marvin Soloway, telephone conversation with the author, March 22, 2015.

¹⁹ Brief for the United States at 3 U.S. v. Eastman Kodak Co., 853 F. Supp. 1454, 1487-88 (W.D.N.Y. 1994) (No. 94-6190) (available at www.justice.gov/atr/cases/f0000/0096.htm/).

²⁰ United States v. Eastman Kodak Co., CCH 1954, Trade Cases para. 67,920. U.S. District Court, W.D. New York. Civil Action No. 6450. Filed December 21, 1954. Case No. 1213 in the Antitrust Division of the Department of Justice.

²¹ Kattelle, 104.

²² “Film Labs ’71: Roundup Report of Business Screen Survey,” *Business Screen* 32.4 (April 1971): 21–27.

²³ James W. Moore, “Look to Your Laboratory,” *Movie Makers* 28.11 (Nov 1953): 294.

²⁴ Glen H. Turner, “A and B Roll Editing,” *Movie Makers* 28.12 (Dec 1953): 322–323.

²⁵ Del Hillgartner, “Super-8 Lab Practices,” *Filmmakers Newsletter* 9.10 (August 1976): 38.

²⁶ Much of the information in this section and the next derives from a series of author-conducted interviews and exchanges with avant-garde filmmakers. Unless otherwise stated, all direct quotations and production context can be attributed to the source cited in the text. For ease of citation, I provide the following list: Robert Beavers, e-mail correspondence with the author, March 18, 2015; Nathaniel Dorsky, telephone conversation with the author, March 22, 2015; Morgan Fisher, e-mail conversation with the author, March 17 and 27, 2015; David Gatten, telephone conversation with the author, June 24, 2015; Janie Geiser, telephone conversation with the author, March 24, 2015; Larry Gottheim, e-mail conversation with the author, April 12, 2015; Barbara Hammer, e-mail conversation with the author, March 23, 2015; Henry Hills, telephone conversation with the author, May 6, 2015; Peter Hutton, telephone conversation with the author, March 18, 2015; Lewis Klahr, telephone conversation with the author, March 24, 2015; Jeanne Liotta, e-mail conversation with the author, March 18, 2015; J.J. Murphy, e-mail conversation with the author, June 28, 2015; Luther Price, telephone conversation, with the author, February 5, 2014; Keith Sanborn, telephone conversation with the author, May 3, 2015; Carolee Schneemann, telephone conversation with the author, April 7, 2015; M.M. Serra, telephone conversation with the author, March 20, 2015; Scott Stark, telephone conversation with the author, April 30, 2015.

²⁷ Marvin Soloway, telephone conversation with the author, March 22, 2015.

²⁸ As discussed in the Introduction, the recent “institutional turn” in avant-garde film scholarship has revised the idea that the avant-garde existed autonomously, emphasizing the degree to which they were embedded within the industry. See especially David E. James, *The Most Typical Avant-Garde: History and Geography of Minor Cinemas in Los Angeles* (Berkeley, Los Angeles, and London: University of California Press, 2005).

²⁹ Keith Sanborn, telephone conversation with the author, May 3, 2015. Sanborn was Frampton’s student.

³⁰ Fred Safran, "Bebell Lab Tour," *Filmmakers Newsletter* 3.2 (December 1969): 9.

³¹ John Whittle, "How to Place an Order with the Laboratory," *Filmmakers Newsletter* 3.6 (April 1970): 20; "A & B Roll Editing," *Filmmakers Newsletter* 2.6 (April 1969): 19. These articles were reprinted from *Alpha Viewfinder*. See also Elinor Stecker, "Titles and the Lab," *Filmmakers Newsletter* 11.8 (July 1978): 38–40.

³² Lipton, 348 and 375.

³³ Bob Crawford, "The Laboratory and the Filmmaker," *Filmmakers Newsletter* 2.8 (June 1969): 19–20.

³⁴ John I. Newell, "The Lab Customer Defined," *Filmmakers Newsletter* 9.3 (January 1976): 12.

³⁵ Gregory Markopoulos, "Correspondences of Smells and Visuals," *Film Culture* 46 (Fall 1967): 38. For an example of Markopoulos's lab problems: Western Cine promised Markopoulos that the splicing of his A-B rolls for *The Illiac Passion* (1969) would be ready by a certain date, but the person in charge left the lab and the job was not completed, forcing Markopoulos to fly to Colorado to re-edit the film. Robert Beavers, e-mail correspondence with the author, March 18, 2015.

³⁶ Ibid.

³⁷ Broughton quoted in Clark McKowen, "James Broughton Interviewed," *Film Culture* 61 (1975–76): 32.

³⁸ James Broughton, "Huntsman, What of the Light?" *Filmmakers Newsletter* 9.12 (October 1976): 78.

³⁹ Bruce Baillie, "Letter from Camano Island, October 10, 1994," in Scott MacDonald, ed., *Canyon Cinema: The Life and Times of an Independent Film Distributor* (Berkeley, Los Angeles, and London: University of California Press, 2008), 430.

⁴⁰ Bruce Baillie, "Letter from Bruce Baillie," *Filmmakers Newsletter* 1.11 (September 1968): 21. See also a 1970 letter to *Canyon Cinemanews* in which Baillie writes at length about working with labs on *Quick Billy* (1970), emphasizing the vagaries of depending upon a lab to realize a film: working with a timer, cutting multiple workprints, and choosing the lab based upon their ability to print an internegative so that he could do longer effects. Bruce Baillie, "Letter," in MacDonald, ed., *Canyon Cinema*, 136–38.

⁴¹ Bill Brand <bbrand@pipeline.com>, "Re: Zorns Lemma print," 8 February 1998, <http://www.hi-beam.net/fw/> (27 July 2015). Thanks to Mike Zryd for calling my attention to this post.

⁴² Lipton, 345.

⁴³ The “Tony” that Geiser refers to is Tony Landano, the owner of Lablink.

⁴⁴ This information is based upon lab receipts housed at the Film-Makers’ Cooperative, 475 Park Avenue South, 6th Floor, New York, New York, 10016.

⁴⁵ All of the information about Cinelab comes from Marvin Soloway, telephone conversations with the author, March 22, 2015 and June 10, 2015.

⁴⁶ For histories of DuArt, see Lynton, as well as John Anderson, “The Movie Crypt at the Top of the Stairs,” *New York Times*, August 24, 2014: AR12. DuArt offers its own corporate history at <http://www.duart.com/aboutduart/>.

⁴⁷ For a basic description of timing, see Ascher and Pincus, 474–502.

⁴⁸ As in the last section, any uncited quotations or production context stems from conversations and interviews with the source. See fn26 for details.

⁴⁹ Recall, for instance, that Scott MacDonald suggests that Hutton is a Luminist filmmaker whose films consciously reference nineteenth-century landscape painting. See Scott MacDonald, *The Garden in the Machine: A Field Guide to Independent Films About Place* (Berkeley, Los Angeles, and London: University of California Press, 2001), 278–288.

⁵⁰ In Geiser’s first film, *The Red Book* (1994), the color palette is exclusively black, white, and red.

⁵¹ Two essential analyses of Geiser’s filmmaking are Melinda Barlow, “Toward a Feminist Coney Island of the Avant-Garde: Janie Geiser Recasts the Cinema of Attractions,” in *There She Goes: Feminist Filmmaking and Beyond*, eds. Corinn Columpar and Sophie Mayer (Detroit: Wayne State University Press, 2009), 51–65; and Genevieve Yue, “Lost at Sea: Intermedial Encounters in the Films of Janie Geiser,” *Grey Room* 36 (Summer 2009): 114–129.

⁵² Gottheim discusses the making of *Horizons* at length in Scott MacDonald, “Interview with Larry Gottheim,” *A Critical Cinema: Interviews with Independent Filmmakers* (Berkeley and Los Angeles: University of California Press, 1988), 86–93. MacDonald provides his own extensive analysis of *Horizons* as a landscape film (even including reprints of some of Gottheim’s original production notecards) in MacDonald, *The Garden in the Machine*, 30–43.

⁵³ Excessive fades and short shots were difficult for most contact printers.

⁵⁴ The films in Stark’s *Chromesthetic Response* series are *Chromesthetic Response* (1987), *The Sound of His Face* (1988), *Satrapy* (1988), and *Protective Coloration* (1990).

⁵⁵ Del Hillgartner, “Full Service in Super-8: An Interview with Lampert Levy,” *Filmmaker's Newsletter* 11.3 (January 1978): 49.

⁵⁶ More typically, filmmakers would distribute their shots across the roles in a checkerboard pattern, alternating the images with opaque black leader. The black leader served to prevent the light from hitting the print stock, ensuring that each shot in the film would be printed onto an unexposed section.

⁵⁷ Nathaniel Dorsky, telephone conversation with the author, March 22, 2015.

⁵⁸ With the advent of digital technology, Gatten was able to realize this goal. *The Extravagant Shadows* (2012), shot on a Nikon D-7000 and edited in Final Cut Pro 7, features fades that last for minutes at a time. I discuss *The Extravagant Shadows* in depth in Chapter Four.

⁵⁹ For a discussion of Gatten's Byrd films, see John Powers, "Glancing Outward: Towards the New Historicist Film," *Millennium Film Journal* 61 (Spring 2015): 75–82, and John Powers, "Glancing Outward: Notes on the New Historicist Film Parts III & IV," *Millennium Film Journal* 62 (October 2015): 58–67.

⁶⁰ Brand quoted in Brian L. Frye, "The Accidental Preservationist: An Interview with Bill Brand," in *Results You Can't Refuse: Celebrating 30 Years of BB Optics*, ed. Andrew Lampert (New York: Anthology Film Archives, 2006), 37. Brand's own films are discussed in Jonathan Buchsbaum, "Composing for Film: The Work of Bill Brand," *Millennium Film Journal* 3 (Winter/Spring 1979): 55–61.

⁶¹ Barbara Hammer, e-mail conversation with the author, March 23, 2015.

⁶² Marvin Soloway, telephone conversation with the author, March 22, 2015.

⁶³ This story is recounted in detail in Raymond J. Haberski, Jr., *Freedom to Offend: How New York Remade Movie Culture* (Lexington: The University Press of Kentucky, 2007), 119–151. A legal perspective can be found in Brian L. Frye, "The Dialectic of Obscenity," *Hamline Law Review* 35.1 (Winter 2012): 229–278.

⁶⁴ Jonas Mekas, "Movie Journal," *Village Voice*, March 12, 1964. Reprinted in Jonas Mekas, *Movie Journal: The Rise of the New American Cinema, 1959–1971*, 2nd ed. (New York: Columbia University Press, 2016), 135.

⁶⁵ See Ara Osterweil, *Flesh Cinema: The Corporeal Turn in American Avant-Garde Film* (Manchester and New York: Manchester University Press, 2014).

⁶⁶ Jack Smith, "The Astrology of a Movie Scorpio," in *Wait for Me at the Bottom of the Pool: The Writings of Jack Smith*, eds. J. Hoberman and Edward Leffingwell (New York and London: High Risk Books, 1997), 55. The films Smith refers to are either Levine's *Yes* (1963) or *Jeremelu* (1963) and Rubin's *Christmas on Earth* (1963).

⁶⁷ Jonas Mekas, "Movie Journal," *Village Voice*, July 4, 1963: 8.

⁶⁸ Ibid.

⁶⁹ Most of the information about Criterion Film Labs is from Barbara Todaro, interview with the author, February 29, 2016; and Brian Todaro, interview with the author, February 26, 2016. See also: "Circle Expands Program," *Motion Picture Herald* 200.8 (August 20, 1955): 18; "Criterion Laboratory Has Expansion Plans," *Motion Picture Daily* 80.2 (July 3, 1956): 5; "Todaro Buys Circle Lab, Now Criterion," *Billboard*, July 7, 1956: 11; "News and Idea Wrap-Up," *Sponsor* 11.2 (January 12, 1957): 58; and "Right Off the Newsreel: Criterion Now in Larger New York Headquarters," *Business Screen* 29.3 (June 7, 1968): 10.

⁷⁰ Lab receipts from 1963–65 are archived at the Film-Maker's Cooperative in New York. There are folders dedicated to receipts from Criterion Film Labs, De Luxe Labs, Filmtronics Labs, Lab-TV, Magno Sound, Misc. Labs, Modernage Labs, Movielab, Precision Labs, Video Film Lab, W.A. Palmer Labs, and Western Cine.

⁷¹ Barbara Todaro, interview with the author, February 29, 2016.

⁷² Walter H. Waggoner, "Obscenity Case May Set Pattern: Is First to Be Tried Under New Felony Statute," *New York Times*, October 22, 1972: 71.

⁷³ Molly Ivins, "8 Held as Principals in Smut Production," *New York Times*, April 27, 1977: 49.

⁷⁴ A rather sensationalized account of Todaro's death can be found in Gene Mustain and Jerry Capeci, *Murder Machine* (New York: Onyx, 1993), v-vii, 224–225.

⁷⁵ See Mekas, "Movie Journal," *Village Voice*, September 7, 1961. Reprinted in Mekas, *Movie Journal*, 2nd ed., 40–41.

⁷⁶ Jonas Mekas, "Movie Journal," *Village Voice*, March 12, 1964. Reprinted in Mekas, *Movie Journal*, 2nd ed., 134.

⁷⁷ See Scott MacDonald, "Interview with Kenneth Anger," in *A Critical Cinema 5: Interviews with Independent Filmmakers* (Berkeley, Los Angeles, and London: University of California Press, 2006), 33.

⁷⁸ Chomont told this story to his friend, M.M. Serra. M.M. Serra, telephone conversation with the author, March 20, 2015.

⁷⁹ While I have heard this anecdote from several sources, the details of this story are not officially "on the record" due to Noren's desire for privacy.

⁸⁰ James Broughton, *Coming Unbuttoned* (San Francisco: City Lights, 1993), 149.

⁸¹ Wakefield Poole, *Dirty Poole: The Autobiography of a Gay Porn Pioneer* (Los Angeles and New York: Alyson Books, 2000), 137.

⁸² *Ibid.*, 227.

⁸³ Ibid., 179.

⁸⁴ See J.J. Murphy, *The Black Hole of the Camera: The Films of Andy Warhol* (Berkeley, Los Angeles, and London: University of California Press, 2012), 181–186.

⁸⁵ Poole, *Dirty Poole*, 161.

⁸⁶ Ibid.

⁸⁷ Marvin Soloway, telephone conversation with the author, March 22, 2015.

⁸⁸ Even avant-garde film experts were troubled by *The Deadman*. Scott MacDonald admits that he hated the film the first time he saw it, as it struck him as “suburban kids trying to be outrageous.” Scott MacDonald, “Interview with Peggy Ahwesh,” in *A Critical Cinema* 5, 131.

⁸⁹ Stan Brakhage, “Stan Brakhage Letters,” *Film Culture* 40 (Spring 1966): 75–76. In 2003, the lab was purchased by Robert David and Dan Clark, who retooled the business for more intensive preservation work. They operated under the name Cinemalab until closing in 2015.

⁹⁰ “Western Cine advertisement,” *Business Screen* 1.20 (1959): 63.

⁹¹ Of these commissions, the most interesting has proven to be *Mr. Tomkins Inside Himself* (1960), an educational film directed and edited by Brakhage, photographed by Newell, and supervised by Phillips.

⁹² Stan Brakhage, “Province-and-Providential Letter,” *Film Culture* 24 (Spring 1962): 91.

⁹³ Letter from Stan Brakhage to Kenneth Anger, 7/6/72, James Stanley Brakhage Collection, Bx 2, Fd 2, Special Collections and Archives, University of Colorado Boulder Archives.

⁹⁴ Stan Brakhage, “How They Were Loving I Think Everything Should Be Seen: Stan Brakhage at Millennium Film Theatre, NYC, February 19, 1972,” *Millennium Film Journal* 47–49 (Fall 2007/Winter 2008): 13.

⁹⁵ Letter from Stan Brakhage to John Newell, 8/31/78, James Stanley Brakhage Collection, Bx 57, Fd 19, Special Collections and Archives, University of Colorado Boulder Archives.

⁹⁶ While some critics were openly disdainful of Brakhage’s “unrefined” technique, a less damning variation on this theme would be that Brakhage’s methods were intuitive and *sui generis* instead of accidental and amateurish. The earliest iteration of the former charge is Ernest Callenbach, “Films of Stan Brakhage,” *Film Quarterly* 14.3 (Spring 1961): 48.

⁹⁷ Brakhage was fond of quoting Erigena’s “All that is, is light,” an apothegm of tangled attribution that he sourced from Ezra Pound’s *Cantos*. For more detail on the source of this quotation, see R. Bruce Elder, *The Films of Stan Brakhage in the American Tradition of*

Gertrude Stein, Ezra Pound, and Charles Olson (Waterloo: Wilfrid Laurier University Press, 1998), 484n.142.

⁹⁸ Letter from Stan Brakhage to Guy Davenport, 5/24/79, James Stanley Brakhage Collection, Bx 10, Fd 6, Special Collections and Archives, University of Colorado Boulder Archives.

⁹⁹ Letter from Stan Brakhage to Henry Hills, 1/2/80, James Stanley Brakhage Collection, Bx 19, Fd 5, Special Collections and Archives, University of Colorado Boulder Archives.

¹⁰⁰ Letter from Stan Brakhage to Ernie Gehr, 9/14/80, James Stanley Brakhage Collection, Bx 16, Fd 18, Special Collections and Archives, University of Colorado Boulder Archives.

¹⁰¹ Letter from Crystal Rae Lanthorn to Stan Brakhage, undated (1979), James Stanley Brakhage Collection, Bx 57, Fd 19, Special Collections and Archives, University of Colorado Boulder Archives.

¹⁰² Nicky Hamlyn discusses the *Roman Numeral* series in Hamlyn, “The *Roman Numeral* Series,” in *Stan Brakhage, Filmmaker*, ed. David E. James (Philadelphia: Temple University Press, 2005), 113–128.

¹⁰³ Brakhage quoted in Scott MacDonald, “Interview with Stan Brakhage,” in *A Critical Cinema 4: Interviews with Independent Filmmakers* (Berkeley, Los Angeles, and London: University of California Press, 2005), 79.

¹⁰⁴ Stan Brakhage, “Transcription of Some Remarks by Stan Brakhage Delivered on February 12th, 1970 at the San Francisco Art Institute on the Occasion of a Showing of Parts 3 and 4 of His Film *Scenes from Under Childhood*,” transcribed by Black Shadow, *Take One* 3.1 (September–October 1970): 8.

¹⁰⁵ *Ibid.*: 7. Famously, Brakhage's 16mm equipment was stolen from his car in 1964 while he was in New York to show the completed *Dog Star Man*. From 1964–66, he edited unused footage shot in earlier years to make several new 16mm films (*Pasht* (1965), *Fire of Waters* (1965), *Black Vision* (1965), and *Two: Creeley/McClure* (1965)), and worked in 8mm on the *Songs* (1964–69).

¹⁰⁶ I am indebted to Mark Toscano for pointing out Brakhage's switch to internegative printing in this period. *Scenes* and *The Horseman, the Woman and the Moth* (1968) were some of the first films for which he made internegs.

¹⁰⁷ Letter from Stan Brakhage to Fred Camper, mid-October 1969, James Stanley Brakhage Collection, Bx 7, Fd 9, Special Collections and Archives, University of Colorado Boulder Archives.

¹⁰⁸ Brakhage “Transcription”: 7.

¹⁰⁹ These numbers stem from Letter from Stan Brakhage to Fred Camper, mid-October 1969, James Stanley Brakhage Collection, Bx 7, Fd 9, Special Collections and Archives, University of Colorado Boulder Archives; and Brakhage, "Transcription": 7.

¹¹⁰ Letter from Stan Brakhage to Jerome Hill, mid-November 1969, James Stanley Brakhage Collection, Bx 19, Fd 3, Special Collections and Archives, University of Colorado Boulder Archives.

¹¹¹ Letter from Stan Brakhage to Jerome Hill, early Feb. Sun. morning (no year [1971]), James Stanley Brakhage Collection, Bx 19, Fd 4, Special Collections and Archives, University of Colorado Boulder Archives.

¹¹² "Stan Brakhage Seminar," *Dialogue on Film* 2.3 (January 1973): 9.

¹¹³ MacDonald, "Interview with Stan Brakhage," 86.

¹¹⁴ Letter from Stan Brakhage to Rick [Western Cine Service], 8/9/82, James Stanley Brakhage Collection, Bx 58, Fd 1, Special Collections and Archives, University of Colorado Boulder Archives.

¹¹⁵ Letter from Stan Brakhage to Western Cine Service, 1/9/81, James Stanley Brakhage Collection, Bx 58, Fd 1, Special Collections and Archives, University of Colorado Boulder Archives.

¹¹⁶ Letter from Stan Brakhage to Bruce Baillie, 8/9/81, James Stanley Brakhage Collection, Bx 3, Fd 15, Special Collections and Archives, University of Colorado Boulder Archives.

¹¹⁷ Letter from Stan Brakhage to Bruce Baillie, 7/16/83, James Stanley Brakhage Collection, Bx 3, Fd 15, Special Collections and Archives, University of Colorado Boulder Archives.

¹¹⁸ Letter from Stan Brakhage to Bruce Baillie, 6/12/84, James Stanley Brakhage Collection, Bx 4, Fd 1, Special Collections and Archives, University of Colorado Boulder Archives.

¹¹⁹ Letter from Stan Brakhage to Alexander Hammid, 8/17/84, James Stanley Brakhage Collection, Bx 18, Fd 6, Special Collections and Archives, University of Colorado Boulder Archives.

¹²⁰ Letter from Dan Woodruff to Stan Brakhage, 8/11/84, James Stanley Brakhage Collection, Bx 13, Fd 6, Special Collections and Archives, University of Colorado Boulder Archives.

¹²¹ Letter from Stan Brakhage to James Herbert, 8/14/84, James Stanley Brakhage Collection, Bx 18, Fd 13, Special Collections and Archives, University of Colorado Boulder Archives.

¹²² Letter from Stan Brakhage to Fred Camper, 10/3/84, James Stanley Brakhage Collection, Bx 7, Fd 11, Special Collections and Archives, University of Colorado Boulder Archives.

¹²³ Letter from Stan Brakhage to Bruce Baillie, 3/20/86, James Stanley Brakhage Collection, Bx 4, Fd 1, Special Collections and Archives, University of Colorado Boulder Archives.

¹²⁴ Brakhage discusses the symmetry of *Delicacies of Molten Horror Synapse* in his program note for the film, as well as in Stan Brakhage, "Fearful Symmetry: Stan Brakhage at Millennium, February 6th, 1993," *Millennium Film Journal* 47–48–49 (Fall/Winter 2007–2008): 120–124.

¹²⁵ Notable exceptions include *A Child's Garden and the Serious Sea* (1991), *The Mammals of Victoria* (1994) and *Commingle Containers* (1996).

¹²⁶ Typically, synchronizers were used for tasks that necessitated exact frame matching, such as conforming the negative to the workprint, cutting the soundtrack, or preparing multiple rolls for printing.

¹²⁷ In fact, Fisher has suggested that the reason for using a 4 Gang synchronizer was partly for its compositional potential: "As I think you can tell, a 4 Gang synchronizer fills the frame nicely... A 2 Gang synchronizer would have left too much room at the edge and would not have been excessive enough to make clear the point of the film; a 6 Gang synchronizer would have left too much room at the top and bottom of the shot." Morgan Fisher, e-mail conversation with the author, March 27, 2015.

¹²⁸ Morgan Fisher, e-mail conversation with the author, March 17, 2015.

¹²⁹ Morgan Fisher, e-mail conversation with the author, March 27, 2015.

¹³⁰ A detailed technical description of the newly built Consolidated Film Industries is available in C.L. Lootens, "A Modern Motion Picture Laboratory," *Journal of the Society of Motion Picture Engineers* 30.4 (April 1938): 363–387.

¹³¹ Morgan Fisher, e-mail conversation with the author, March 17, 2015.

¹³² Ibid.

¹³³ Murphy quoted in Scott MacDonald, "Interview with J.J. Murphy," *A Critical Cinema*, 185.

¹³⁴ J.J. Murphy, e-mail conversation with the author, June 28, 2015. Much of the information about the making of *Print Generation* derives from this conversation.

¹³⁵ Scott MacDonald, *Avant-Garde Film: Motion Studies* (Cambridge: Cambridge University Press, 1993), 45–53, and James Peterson, *Dreams of Chaos, Visions of Order: Understanding the American Avant-Garde Cinema* (Detroit: Wayne State University Press, 1994), 110–112.

¹³⁶ J.J. Murphy, e-mail conversation with the author, June 28, 2015.

¹³⁷ Murphy quoted in MacDonald, "Interview with J.J. Murphy," 185.

¹³⁸ Jorge Luis Borges, “Fragments from an Apocryphal Gospel,” in *In Praise of Darkness*, trans. Norman Thomas di Giovanni (New York: Dutton, 1974).

¹³⁹ Jeanne Liotta, e-mail conversation with the author, March 18, 2015.

Chapter Three Regeneration: Optical Printing

During the 1970s and 1980s, avant-garde filmmakers mastered a device traditionally used for Hollywood special effects work: the optical printer. A fairly complex apparatus that allows for duplication of film through rephotography, the optical printer contributed to a shift in emphasis from production to post-production, as filmmakers retroactively transformed their images with unprecedented levels of control. In contrast to the studios, the avant-garde incorporated optical effects into their own formal paradigms, which privileged perceptual transformation over a seamless diegesis. Some used the printer functionally to achieve very specific effects, while others became virtuosos whose films depended upon a sophisticated understanding of the device's aesthetic possibilities. Soon, the optical printer became a mainstay of MFA programs and filmmaker's cooperatives, as fundamental to avant-garde practice as reversal stock and Bolex cameras. Surveying the previous decade, P. Adams Sitney concluded: "Just as rapid editing with invisible splice marks had, for many filmmakers, become a mark of aesthetic authority in the early sixties, optical printing represented technical mastery in the seventies."¹

An optical printer is a device on which film is rephotographed one frame at a time. As opposed to contact printing, whereby film is copied by holding two strips of film together, the defining characteristic of optical printing is separation. At its most basic, an optical printer consists of four principal components: a camera with an attached lens system, a projector, and a light source. The projector and camera face each other. Positive film (previously exposed or found) advances through the projector gate, where it is illuminated by the light source. The camera records the image onto unexposed film stock. (Although commonly referred to as a

“projector,” the original film isn’t projected in the traditional sense; it is more accurate to think of the projector as a light box over which film advances at regular intervals.) The chief advantage of the system is that it permits a wide variety of manipulation to the original image during the rephotography process. Images can be sped up, slowed down, reframed, alternately lit and colored, or combined with other images in complex ways. Used in conjunction with techniques like painting, dyeing, or bleaching the film, the printer becomes capable of qualitatively transforming the image. Therefore, the optical printer can be viewed as both an extension of older methods for image modification as well as a new avant-garde filmmaking aesthetic.²

Despite the optical printer’s importance for multiple generations of filmmakers, many questions remain unanswered. What were the most common optical printing techniques for experimental filmmakers, and to what degree did they reinforce and reconfigure the avant-garde’s emphasis on perceptual transformation? How did filmmakers work within the constraints of the technology to use the optical printer as an expressive device? How does the optical printer highlight the importance of working process, materiality, and reworking that mark the avant-garde’s approach to technology? How did particular filmmakers make the optical printer an integral part of their personal styles? What are its practical and theoretical dimensions? How did an expensive and complex technology associated with Hollywood make its way into the avant-garde, and to what extent does this reflect the connection between the avant-garde and the advanced amateur, do-it-yourself (DIY) tech scene that flourished on the West Coast in the postwar years?

In addition to its contributions to aesthetics, we lack a chronological account of the history of optical printing within avant-garde cinema. In recent years, the work of scholars such as Scott

MacDonald, Michael Zryd, and Erika Balsom has signaled an “institutional turn” in avant-garde scholarship, illuminating neglected topics like distribution, exhibition, and the relationship between the avant-garde and the Academy.³ This dissertation contributes to this development by shifting the focus to technology. Additionally, Gregory Zinman and Julie A. Turnock have examined the avant-garde’s influence on commercial special effects, charting the ways in which experimental filmmakers have shaped blockbuster aesthetics through handmade processes and composite *mise-en-scène*. In some respects, I take the opposite approach, contextualizing avant-garde filmmaking technology in relation to advanced amateur and semiprofessional markets.⁴ Ultimately, I argue that optical printing provides a remarkable example of artists, machinists, and hobbyists assimilating a commercial technology and repurposing it for their own expressive ends.

Institutional histories of the avant-garde emphasize its autonomy from, and opposition to, the studio system. P. Adams Sitney’s claim that the avant-garde and commercial cinema “operate in different realms with next to no significant influence on each other” alludes to the fact that the avant-garde was often forced to build its own infrastructure for distribution, exhibition, and criticism.⁵ In what follows, I argue that avant-garde filmmaking technology was imbricated within a semiprofessional network of advanced amateurs, tinkerers, hobbyists, and technical gurus who capitalized upon the wave of 16mm film production that flourished after World War II. As a product of this networked affiliation, low-budget optical printers represent instances of filmmakers and technicians reprocessing commercial technologies to realize visual effects of unprecedented complexity. Moreover, I trace the path of the optical printer from its innovation in do-it-yourself tech circles to its diffusion in filmmaking cooperatives and universities, where it became a standard component of the avant-garde filmmaking curriculum.

Additionally, I claim that the widespread adoption of the optical printer influenced filmmaking aesthetics, as the avant-garde's longstanding investment in visual novelty and perceptual transformation shifted from in-camera effects to manipulation of footage in post-production. The immediate postwar avant-garde relied heavily upon in-camera techniques such as superimposition, slow and fast motion, and anamorphic lenses, as exemplified by films such as *The Cage* (Sidney Peterson, 1947). For later generations, the optical printer refigured the process of shooting as gathering raw material to be revised later. Images became susceptible to rhythmic alteration, repetition and multiplication, being slotted into grids, composited with other images, or used in conjunction with techniques like hand processing and backlighting. As William C. Wees has noted, avant-garde filmmakers have always championed the visual nature of the film medium, insisting upon the liberation of perception as the primary objectives of the cinema.⁶ The optical printer reveals that technology is a proximate influence on this pursuit, contributing to a more nuanced sense of visual style in a wide variety of avant-garde films.

The optical printer allowed avant-garde filmmakers to go much further in their pursuit of transformative visual experiences, particularly by allowing frame-by-frame control over their images. In the hands of the most sophisticated practitioners, the printer became an expressive device that could be played like a musical instrument. Because the printer was far removed from real-world shooting and demanded close attention to each frame—making “decisions on the slightest bits of information,” as Carolee Schneemann put it—filmmakers' working processes shifted towards immersive, monk-like devotion to their images.⁷ In describing their relationship to the printer, many filmmakers invoke other detail-oriented, process-based arts. For Barbara Hammer, the printer is a painting tool that allows her to touch film, while Ken Kobland views the printer as a kind of sewing machine, and the process of making a film a dance. Pat O'Neill's

interest in the combinatorial possibilities of working with the printer stemmed from his enthusiasm for building cars in his youth. Optical printing demanded such concentration that artists often found themselves lost in the tiny rectangle of the frame. Mary Beth Reed described Stan Brakhage after a printing session: “Stan’s hair would be in different directions, his face would be flushed and he would glance around slightly confused, as if he had been traveling somewhere and had stopped in a distant yet vaguely familiar place.”⁸

In addition to the possibility for complex visual effects, the optical printer changed the artist’s orientation to his or her materials. The fact that much of the creative work of filmmaking had shifted to the post-shooting phase edged the artistic process towards recombination, revision, and reworking. In Chapter One, I argued that working directly with the filmstrip’s emulsion was a method for mining found images that did not depend solely upon juxtaposition to make meaning; the same is true of optical printing. The optical printer transforms the process of shooting into one of gathering raw material to be revised later instead of capturing a profilmic scene with a preexisting spatiotemporal integrity. In some cases, it takes the shooting stage out of the equation, freeing filmmakers to make original and found footage their own through retroactive manipulation. As Phil Solomon recalled, “I remember Saul Levine saying, *half* in jest, ‘Optical printing is for people who couldn’t get it together the first time.’ In some ways that’s absolutely true for me. I have a primary phase where I shoot in the world, and a secondary phase where I resee and transform what I’ve shot.”⁹

On the face of it, the optical printer would seem to be a very different technology from the 16mm filmstrip discussed in Chapter One. 16mm is a physical object that can be sculpted, but the optical printer is a rephotography device that imposes layers of distance between the operator and the film, foregoing tactility and intimacy for intangibility and separation. If working with the

filmstrip is rooted in spontaneity, working with the optical printer often demands calculation. In reality, however, the technologies are closely related. Some filmmakers consider the printer an immensely tactile device that fosters bodily connection between the filmmaker and his or her materials. Others use the printer to burrow deeply into their footage, studying it closely to place it within surprising new contexts. Due to its versatility, the optical printer appealed to a broad range of filmmakers, uniting disparate strands of avant-garde practice. Poetic filmmakers could slow images down and invest them with lyricism and rhythm. Structural/Materialist filmmakers, who were already exploring loop printing and permutational schemas, could repeat, multiply, or slot images into grids with relative precision. Collage filmmakers could combine found footage with other cinematic ephemera, and for experimental animators, the optical printer was much like an animation stand or multi-planar camera, which demanded a solitary, craft-based practice.

This chapter explores the optical printer as a system of art-making that has both practical and theoretical ramifications, which avant-garde filmmakers tackled with fervor and intensity. First, I provide an institutional history of optical printing in the avant-garde, tracing its beginnings in the 1930s through the DIY era of the 1940s–1960s to its institutionalization with the advent of the JK optical printer in the 1970s. Using a range of examples, including films by Caroline Avery, Peter Rose, Ken Kobland, Su Friedrich, and Martin Arnold, I provide an overview of common optical printing techniques in the avant-garde, including modifying the composition, skip and step printing, manipulation of lighting and coloring, bipacking, mattes, in addition to suggesting some of their theoretical implications. An extended consideration of Pat O'Neill's *Saugus Series* (1974) highlights the combinatory possibilities of the optical printer, while Barbara Hammer's films serve to link the printer with tactile engagement, technical effects that function metaphorically, and advocacy for marginalized groups.

Optical Printing in the Avant-Garde: An Institutional History

Although its fortunes waxed and waned, optical printing was available to the Hollywood studios as early as the 1920s, when new fine grain, low contrast film stocks were introduced, allowing for duplication without dramatic image degradation.¹⁰ Throughout the next decade, the studios built their own makeshift printers, often assembled from discarded photographic equipment and catered to the individual needs of a specific project. Optical printing received a degree of notoriety in the industry due to the pioneering work of Linwood Dunn, who was in charge of the optical effects department at RKO, where he worked on films such as *Flying Down to Rio* (1933), *King Kong* (1933), *Bringing Up Baby* (1938), and *Citizen Kane* (1941). Optical printers were primarily used for compositing material shot separately into a single frame, usually as traveling mattes—prototypical examples include Katharine Hepburn interacting with a leopard in *Baby* and the dramatic deep space composition of Charles Foster Kane discovering Susan's body after her attempted suicide in *Kane*.¹¹ In 1944, Dunn and his colleague, Cecil Love, developed a printer for Eastman Kodak to service the United States Armed Forces Photographic Units. The result, the Acme-Dunn optical printer, quickly became the standard for Hollywood special effects.¹² In 1957, a competing model, the Oxberry Optical Printer, was introduced.¹³

In the realm of avant-garde filmmaking, however, optical printing remained a minority practice. Most prohibitive was the exorbitant expense of such a massive, mechanically complex piece of equipment. When the Acme-Dunn printer debuted in 1944, it sold for \$25,000 (roughly \$337,000 in 2015), far beyond the reach of any individual filmmaker; by 1975, the cost was closer to \$100,000 (\$452,000 in 2015).¹⁴ Furthermore, an infrastructure that would allow avant-garde filmmakers access to expensive equipment did not begin to emerge until the late 1960s. In the absence of artist cooperatives or film production departments in universities, where member

donations or academic budgets could be allotted for shared equipment, avant-garde filmmakers were left to execute most of their effects in-camera or at the lab. Of course, a filmmaker could build his or her own optical printer, but this was easier in theory than in reality. At the very least, one would need a Bolex camera augmented by bellows attachments or extension tubes, a projector capable of advancing one frame at a time, and a light source bright enough for illumination but cool enough that it would not burn the film in the gate. Lining up the camera precisely with the projector's aperture, keeping the entire apparatus steady, and ensuring proper registration were constant technical struggles. For this reason, most homemade printers were DIY affairs, lacking the finesse and polish of their professional counterparts. Even as late as 1975, the author of a how-to article for amateurs on building an optical printer damns his own creation with faint praise: "As an optical printer the device is primitive, but it works as long as you're careful."¹⁵

Despite these difficulties, a few of the more technologically inclined filmmakers succeeded in building their own printers. Using a lathe as a base, James Sibley Watson, Jr., made his own optical printer for *Lot in Sodom* (1933, co-directed with Melville Webber), where it was used for a series of lengthy dissolves that effectively function as multiple superimpositions. These lap dissolves were so prominent that film critics praised the film for its "great beauty," "subtle technique," and technical capacity advanced enough to surpass "the best achievements of the professional screen."¹⁶ Interestingly, the technique was novel enough in 1933 that even sophisticated critics could not determine how the film was made. Writing in *Film Art*, a British journal, critic Leonard Hacker noted that the superimpositions were both the most interesting and mysterious aspect of the film: "Its chief distinction is the use of the 'Dissolve' harmonizing mobile forms one into the other, akin to the 'Lap-Dissolve' but employing a method still

unexplained.”¹⁷

Later in the decade, John Whitney designed an 8mm optical printer on which he and his brother, James, made their first film, *Twenty-Four Variations on an Original Theme* (1939–40). The brothers used a stencil-and-airbrush technique to create hundreds of patterned file cards, which were photographed in succession. This black-and-white film was later “colorized” by rephotographing the cards onto color film stock on the optical printer. Shortly thereafter, Whitney secured a loan for a Kodak Cine Special 16mm camera, which he combined with an Eastman 16mm projector to make an upgraded optical printer. It was on this printer that the brothers made *Five Film Exercises* (1943–44). For these short animated experiments, the brothers took single-frame exposures of paper cutouts changing shape in relation to a pantograph machine. Using this footage as raw material, the shapes were rephotographed on the printer, where, according to John Whitney:

We could exert another level of editorial or creative control and generate permutations of [a given shape], variations on [the shape], and juxtapositions of it over itself. We also took advantage of the fact that we could invert the films so we’d have the same image upside-down, and we could flop the film so we’d have the same image mirrored, and we could run the film forwards or backwards throughout optical printing.¹⁸

Inspired by the Whitneys, visual music artist Hy Hirsh built an optical printer by hand, on which he helped Harry Smith step print (that is, decelerate motion by rephotographing each frame twice) the first few of his handmade *Early Abstractions* (1946–49), which also obviated the necessity of sending the films to the lab, where the laboriously worked 16mm filmstrips would likely have been damaged. Hirsh, who had been a cinematographer for Columbia Pictures in the 1930s, had established a reputation in the Bay Area as a technological guru. In addition to his printer, he developed an “oil wipe” process similar to that of the Whitneys and experimented with oscilloscope technology, earning him, according to William Moritz, the title of “*bricoleur*:

someone who can make everything himself.”¹⁹ He was also generous with his knowledge, providing technical assistance for nearly all of the West Coast avant-garde filmmakers, including Jordan Belson, Frank Stauffacher, Patricia Marx, Larry Jordan, and James Broughton.²⁰

In addition to being avant-garde artists, the Whitneys and Hirsh shared affinities with a branch of advanced amateur filmmakers who could be appropriately described as semiprofessional technology enthusiasts. As Charles Tepperman has argued, the gap between amateur and professional filmmaking narrowed in the postwar years, as amateurs strived for greater degrees of sophistication and associated more freely with the burgeoning spheres of experimental, nontheatrical, and independent film production.²¹ This loose affiliation of amateur filmmakers was also characterized by their willingness to experiment with different technologies. Tepperman notes that “amateur cinema provided opportunities for individuals to engage productively with machines and to adapt the use of these machines to individual—expressive, artistic, familial—objectives.”²² The results of this experimentation varied, but the desire to capitalize upon consumer-grade technologies, from sound to color to widescreen and 3D moviemaking, was pursued with increased vigor.

While undoubtedly a minority, advanced amateurs—many of whom operated outside of avant-garde film circles—began to show some interest in building their own optical printers throughout the 1950s. In 1959, *American Cinematographer* published an article detailing the creation of a homemade optical printer by Tullio Pellegrini, an Italian American amateur filmmaker with an interest in technology. Pellegrini had previously experimented with widescreen in his acclaimed travelogue *San Francisco* (1955), which used its wider format to present panoramic views of the city.²³ Pellegrini also took out ads in *Movie Makers*, the publication of the Amateur Cinema League, selling his specially designed variable speed shutter

unit for Bolex cameras.²⁴ To make a low-budget printer that would be capable of producing superimpositions, Pellegrini combined a Bell & Howell 16mm projector with a Bolex camera and used a turntable as the base. The device was powered by pulleys that were fastened to the turntable. An electrical connector and a solenoid were used to synchronize the shutters of the projector and camera, while a piece of cardboard was used as a screen to channel light from the projector to the camera. A number of other slight modifications are outlined in the article, which provides step-by-step instructions for readers anxious to follow in Pellegrini's footsteps.²⁵

American Cinematographer's proclamation that "reader interest" compelled them to publish the details of Pellegrini's invention implies that other amateurs might wish to replicate the experiment at home.²⁶ Pellegrini was noteworthy not only for his inventiveness, but also for the fact that he was interested in marketing his DIY designs to the wider semiprofessional community, even selling his variable speed shutter for \$109.80 (\$965 in 2015), complete with insurance and a one year guarantee.²⁷ Pellegrini's example testifies to the fact that the boom in postwar 16mm semiprofessional filmmaking brought with it an excitement for technological innovation. Unfortunately for amateurs, professional technology was imperative for more aesthetically accomplished films, but most of the equipment used by the studios—indeed, almost anything associated with the medium, from cameras to lab work—was exorbitantly expensive for an individual.

This simultaneous emphasis on infrastructure, ingenuity, and aesthetics would characterize the next phase of the development of a low-cost optical printer. The path to an affordable and feasible printer for avant-garde and semiprofessional filmmakers was cleared in the 1960s, a decade marked by three major developments. First, the avant-garde's association with the semiprofessional market only increased, freely mixing technological fetishism with a

DIY ethos that stressed handmade solutions to artistic and technical problems. Second, an infrastructure for the avant-garde began to emerge, with distribution cooperatives, media centers, exhibition spaces, and faculty appointments at colleges and universities providing support for experimental filmmakers and their students. Third (and most importantly), avant-garde filmmakers embraced a set of aesthetic impulses and formal paradigms that encouraged the use of optical effects and rephotography. Consequently, the 1960s was a period of aesthetic and institutional fits and starts that would set the stage for the technological standardization that would occur in subsequent decades.

Even if their aesthetic goals differed, the desires of advanced amateurs to gain access to professional equipment continued to dovetail with those of many avant-garde filmmakers. The technological imbrication of the avant-garde with the semiprofessional market can be illustrated in microcosm by the vicissitudes of *Filmmakers Newsletter*, a publication founded in 1967 as an outgrowth of The Film-Makers' Cooperative for the purpose of disseminating information about screenings, festivals, Happenings, and technological developments to the Coop's members. In its first few years, *Filmmakers Newsletter* fulfilled this commitment to the avant-garde, reporting on the Coop's activities, the formation of Millennium Film Workshop in New York, the Ann Arbor Film Festival, and filmmakers such as Will Hindle and Robert Nelson, even publishing significant thinkpieces, such as Stan Brakhage's "In Defense of the 'Amateur Filmmaker.'"²⁸

Remnants of these avant-garde beginnings carried over into the 1970s through the participation of technical gurus of the experimental film scene such as Lenny Lipton and Bob Parent, occasional profiles of filmmakers like Jordan Belson, and wrap-ups of avant-garde festivals, including Ann Arbor and Bellevue.²⁹ For the most part, however, the magazine evolved into a kind of *American Cinematographer* for semiprofessionals, assigning most of its pages to

features on artier studio films, television production (especially newsworthy affairs such as the 1976 Presidential Election), and “event shooting,” often in the form of firsthand accounts of technically complicated film shoots, such as skydiving or a man freeing himself from a straitjacket while suspended over Niagara Falls.³⁰ These features were combined with promotional material, advertisements, and reviews for new products, including cameras, tripods, microphones, accessories, labs, optical houses, and film equipment rental services.

In the pages of *Filmmakers Newsletter*, a fetishization of technical ability (especially to execute tricky film shoots or achieve results comparable to studio productions) and commitment to professionalization sat alongside a DIY ethos that never completely abandoned the idea of an experimental cinema rooted in smaller gauges, amateur ingenuity, and alternative platforms. This latter impulse can be seen most clearly in the equipment reviews and technical advice columns, which offered explanations of basic film technology and suggestions for how to build filmmaking accessories of nearly every variety at home. In an early column entitled “Filmmaker’s Notebook,” authors explained the protocols for basic procedures, such as multiple-roll printing, marking workprints for the lab, and creating sample budget proposals.³¹

One of the magazine’s longest running columns was animator L. Bruce Holman’s “Building Cine Stuff,” which ran in almost every issue from 1970 to 1978. In the column, Holman offered step-by-step tutorials on designing and building filmmaking devices on a budget with readily accessible materials. Some of Holman’s most ingenious designs included trim bins, editing benches, camera cases, animation stands, microphone booms, rear projection screens, and optical printers.³² A model of resourcefulness, Holman’s DIY optical printer was cobbled together from discarded camera equipment. It involved turning a “blitzed” movie projector (with the lamphouse, case, and shutter yanked out) upside down and bolting it to a wooden board with

mounting screws gleaned from the handle. A Mitchell matte box (a device typically used on the end of a lens to block glare or lens flare) was taken apart and refashioned as a sliding mount for the camera to move in and out in relation to the projector. Although the optical printer could work, it was extraordinarily precarious. In characteristically droll prose, Holman encapsulates the handcrafted ethos when he writes: “Bear in mind that home-made optical printers are not quite the equal of ones which cost a hundred G’s, but you can build one which will work, and building it yourself will save you about nine hundred ninety-nine thousand dollars and some change.”³³

In many respects, this strain of the avant-garde, in which the filmmaker is also inventor, educator, and adviser is epitomized by Lenny Lipton, whose own films never became as well known as his encyclopedic technical knowledge and willingness to share information with the avant-garde filmmaking community. In the 1960s, Lipton was active in the counterculture, contributing to *The Realist* (1958–2001) and *The Berkeley Barb* (1965–80), associating with figures like Timothy Leary and Ken Kesey, and penning the lyrics to “Puff, the Magic Dragon,” made famous by Peter, Paul and Mary. While making short avant-garde films between 1965 and 1975, Lipton wrote two hugely influential books, *Independent Film Making* and *The Super 8 Book*, which meticulously explained the basics of film technology to the experimental filmmaker in highly readable, conversational prose.³⁴ Later in his career, Lipton devoted himself to stereoscopic displays, becoming one of the leading inventors of modern 3D filmmaking technologies.³⁵ Due to his varied interests and technical facility, Lipton operated within the avant-garde, the industry, and the amateur filmmaking scene, serving as a bridge for filmmakers who needed technological proficiency to realize their unorthodox formal objectives.

Outside of the semiprofessional market, the avant-garde was developing its own infrastructure that would facilitate access to equipment for filmmakers. In a thinkpiece published

in *Filmmakers Newsletter*, avant-garde filmmaker Charles Levine proposed a theoretical entity called the Institute of Advanced Cinema. Noting that tools like computers, video tape recorders, and optical printers were prohibitively expensive, primarily owned by corporations or government agencies and scattered in remote locations, Levine suggested that the Institute could make “both the technicians and hardware available to artists under one roof and at the same location.”³⁶ Two issues later, Gary Smith offered a scathing rejoinder entitled “Millennium Exists,” calling attention to the fact that Millennium Film Workshop, an independent film school, workshop, and equipment library was “open to anyone wishing to make films; to anyone who already makes films and needs equipment; to anyone who just wants to learn about sound recording, editing on professional equipment, and cameras.”³⁷ In addition to snarkily pointing out the chief advantage of Millennium over the Institute of Advanced Cinema—namely the fact that Millennium actually existed in reality—Smith took pains to assert that buying sophisticated machines like computers was premature, both financially and practically:

Millennium has to have basic equipment first before we get our computers installed. We want things for immediate use such as optical benches, animation stands, cameras, projectors, editing equipment of all kinds, developers, sound rooms, and equipment for recording, mixing, and transferring. All this equipment is expensive, but not beyond thinking about. We want all of it, but we want it in proper order. What would we do with a computer when we hardly know how to take care of a developer? If we owned a computer, it would inevitably be hung with a ‘Do Not Kick’ sign. All that machinery will be ours someday, but when I called I.B.M. to price some things, the man said, ‘If you have to ask, you can’t afford it.’ And Charles baby, we have to ask.³⁸

In addition to Millennium Film Workshop, cooperatives were beginning to spring up in other cities, offering consultation, workshops, and, most crucially, cheap access to expensive equipment for avant-garde filmmakers. For \$20 a year, the Pittsburgh Independent Film-Makers Coop provided editing and screening facilities, a variety of equipment and accessories, and training in the use of the equipment. The Chicago Coop, which boasted filmmakers Tom

Palazzolo and Ronald Nameth on its Board of Directors, offered similar services, as well as distribution of members' films.³⁹ In addition to artist-run Coops, the late 1960s marked the first wave of avant-garde filmmakers teaching film in college production programs, where students were exposed to both film technology and its more radical aesthetic applications by Gregory Markopoulos at the School of the Art Institute of Chicago, Robert Nelson at the San Francisco Art Institute, Carl Linder at the School of Visual Arts in New York, and Paul Sharits at the Maryland Institute College of Art.⁴⁰

Within avant-garde film circles, the need for low-cost, effective filmmaking equipment that was easy to access became a paramount concern. In a letter to Stan Brakhage, Larry Jordan decried the dearth of reliable tools for independent filmmakers, explaining that he had been designing sound mixers and optical printers to rectify this deficiency:

[I] am bringing to a close a two-year period of designing and either building myself, or having built, sane pieces of filmmaking equipment, as I found there were relatively few on the market to buy... But I have satisfied that drive and feel these things had to be done and now they are done and I can settle down in a saner area of 16mm film tools and get into the films the way it should have been possible to do in this technologically mad society years ago.⁴¹

Jordan frames the problem as both a necessity and a distraction, a situation that filmmakers are obliged to confront, but one that ultimately takes them away from the more important business of art making. This sentiment was echoed even by *Filmmakers Newsletter*:

It's easy to get caught up in the heady thrill of manufacturing your own super-cine-gizmos, however ... the object of the game is to make films to change the world, not to piddle away your time re-inventing cute little machines that have been around since D.W. Griffith's time. If you can afford the going market price of a piece of equipment, and there's no good reason to boycott the manufacturer, buy it and get back to filmmaking.⁴²

As in the 1930s and 1940s, avant-garde filmmakers were compelled to make their own optical printers, but with the newly established institutional structure, the information was easier

to disseminate. In 1967, Lenny Lipton published a set of instructions for recreating his own homemade optical printer in *Canyon Cinemanews*, the newsletter published by the West Coast distributor Canyon Cinema.⁴³ Lipton extolled the virtues of the printer, highlighting the device's liberatory potential for intrepid filmmakers:

What can be done by this printer is limited only by the imagination. Dissolves of all lengths and multiple exposures, freeze frames intermixed with action, repeat scenes, masking, bi-packing originals in the film gate, color alteration that has no end ... and more! For those who like, A&B&C& roll printing could be done, at least over 100ft lengths. We've had fun printing color separations of a single scene slightly out of phase with one another.⁴⁴

Lipton also stressed that building a printer demanded an attention to detail and technical facility that would allow its builder to remain steadfast in the face of so much testing, checking, securing, and controlling, reaching the conclusion that “trial and error is the only answer for building your own version.”⁴⁵ Specifically, optical printing was a process rife with technical problems that took patience and time to solve. As Lipton notes, lens length determines the amount of space between lens and projector gate, which affects the magnification of the image. Exposure levels differ depending upon the film stock used in rephotography, which necessitates a barrage of tests to avoid over or underexposure. When working with color stock, corrective filters will often be employed to manage saturation. The brightness of the light source significantly influences the image, but it cannot be so bright that it burns the film in the gate. Although Lipton's article avoids the problem, synchronizing the camera and projector to achieve precise registration was a constant headache.

Many of these hurdles were overcome by the filmmaker Standish Lawder, who built an extraordinarily sophisticated optical printer in 1971–73. Lawder already had experience forging homemade filmmaking devices out of unlikely materials, having made a contact printer out of an old camera, an incandescent light bulb attached to a dimmer, and a Chock full o'Nuts coffee

can.⁴⁶ On an episode of Robert Gardner's television series, *Screening Room*, Lawder displayed his newly constructed optical printer for Gardner and Stanley Cavell. In contrast to the DIY printers made by Pellegrini or Lipton, Lawder's projector head threw the image onto a mirror, where it was bounced onto a "piece of rear-screen material" that essentially functioned as a screen. The camera was attached to a motor that pulled it closer or further away from the screen, circumventing the need for a bellows attachment. In addition, Lawder's printer was equipped with a sequencer that programmed the machine to perform a predetermined exercise, "a little like a slow motion computer," according to Lawder, leading him to joke that he could program the device, go to bed, and wake up in the morning to find his film completed.⁴⁷ In particular, Lawder was fascinated by the printer's ability to carry out computer-like applications, explaining, "I'm going to develop the machine as an instrument so as to understand what it is best, itself, capable of expressing."⁴⁸

Lawder's language here, which invokes computers, predetermined filmic algorithms, and medium specificity, suggests that his appreciation for optical printing was linked to ideas associated with Structural Film, the reigning formal paradigm of the era.⁴⁹ Of course, the optical printer did not determine the films that were made, but it did facilitate visual effects that avant-garde filmmakers were already struggling to achieve by different means. For instance, without recourse to an optical printer, Bruce Baillie experimented with other methods of compositing images in films such as *Quixote* (1965), *Tung* (1966), and *Castro Street* (1966). Anticipating an optical printing aesthetic, Baillie made homemade mattes with black tape, prisms, and glasses, which he then combined with multiple-roll printing at the lab for densely packed superimpositions.⁵⁰ In a famous example from *Castro Street*, railroad cars moving in opposite directions are split in the center of the frame while another image of a car is superimposed at an

oblique angle, creating a mesmerizing and lyrical parallax effect. Despite his success, Baillie expressed his frustration with the “virtual optical printing” that he was forced to do in absence of the real thing. Explaining a complicated two-projector system for matte control that he had devised for an unrealized project, *Morning Star*, Baillie complained:

There really ought to be control and availability with optical printing to do this type of thing... The ideal thing would be an optical printer with at least three projectors operating just like tape recorders. Three projectors playing back into the recording camera, each of which can be controlled in terms of light intensity, total malleable matting on each... And so then a guy can just sit down and play [the optical printer] like an organ and mix as he will, and not at all be stuck with random superimpositions.⁵¹

In a different vein, other avant-garde filmmakers were pursuing rephotography to mine their images for alchemical revelations. In the enormously influential *Tom, Tom, the Piper's Son* (1969–71), Ken Jacobs performed an act of cinematic resurrection, subjecting a 1905 American Mutoscope & Biograph short of the same name to a two-hour workout on a Kalart-Victor analytic projector, the results of which were photographed on an adjacent Bolex. The original was slowed down and sped up again, details were isolated, and gestures were repeated in cycles of infinite return, as Jacobs made visible that which was easily overlooked on first, second, or third viewing. As many critics have noted, Jacobs's intention is ultimately pedagogical, using technology to delve into the image to see what it can reveal. In his own words: “I enjoy mining existing film. Seeing what film remembers, what's missed when it clacks by at normal speed... I usually take short lengths of film and pore over them, or pour into them. Dig into them. So it's mining. And I'm looking for things that literally you just don't see when it zips by at 24 frames per second, normal sound speed.”⁵²

Even if Jacobs had gained access to an optical printer, he likely would not have used it. A major component of *Tom, Tom* is the fact that it is performed. This aspect of the work is both a

reminder that visual analysis always reflects back upon the apparatus that makes it possible, and a pedagogical imperative that true understanding stems from an active and ethical engagement with an image.⁵³ Nonetheless, Jacobs's film demonstrated the possibilities of rephotography to dramatically alter found or original footage through frame-by-frame manipulation. In terms of both methodology and specific visual effects, *Tom, Tom*—along with films by Baillie, Kenneth Anger, Pat O'Neill, and others—signaled that a standardized, low-cost optical printer would be hugely beneficial to avant-garde filmmakers in realizing some of their most ambitious aesthetic goals.

Standish Lawder's printer, which was constructed over the course of a year in piecemeal fashion, was a technical marvel, but it was a one-of-a-kind machine, too gigantic, complex, and unwieldy to be mass produced, even on a small scale. The most pressing need was for an optical printer similar in ambition and functionality to the DIY printers fashioned by Pellegrini and Lipton, but standardized with reliable solutions to basic technical problems and capable of being mass produced. The JK optical printer, invented by Jaakko Kurhi of JK Camera in 1971–72, addressed this need.⁵⁴ Although its design was fairly simple, and the operations that it could perform were limited in comparison to a professional printer like an Oxberry, the JK printer leveled many of the technical hurdles that plagued earlier inventors, especially in terms of registration. In addition, Kurhi was a machinist who had the capacity to reproduce his design over and over again with standardized parts; in contrast to the one-of-a-kind quality that characterized printers from Watson to Hirsh to Lawder, the JK printer could be made on order, purchased by colleges or arts institutions across the country. By the early 1980s, the JK had become the most frequently used optical printer for avant-garde filmmakers.

Kurhi's printer emerged from the filmmaking tech scene in San Francisco and Los Angeles in the late 1960s. Much of the technological innovation in this period orbited around the film department at the San Francisco Art Institute (SFAI). In 1965, filmmaker Robert Nelson became the first chair of the department, and by the time he accepted a teaching appointment at CalArts in 1969, SFAI had become one of the leading schools for independent and experimental filmmaking. When Larry Jordan was hired to replace Nelson, he took it as his mission to "collect all the top filmmakers," quickly hiring Gunvor Nelson, James Broughton, and later, George Kuchar.⁵⁵ When Robert Nelson left, he sold the department a 16mm Arriflex camera and a Nagra portable audio recorder, but the facilities remained very rudimentary. Jordan began to "hustle to get equipment for the place." He recalled:

One day, I walked past the Dean's Office into the President's Office and told him we needed \$20,000 to buy equipment. I thought he was going to kick me out, but he said, "Well, I think you know what you're talking about." And in those days, private institutions like the Art Institute were funded pretty much by the wealthy people in the community, and he was one of them. He got on the phone with his friends, and right away there was \$20,000 and we got more equipment. In those days, \$20,000 could buy a lot of stuff.⁵⁶

In addition to Jordan's general investment in building an avant-garde infrastructure, his efforts were on behalf of an adventurous group of MFA students that included Peter Hutton, Babette Van Loo, Vincent Grenier, Henry Hills, Sandra Davis, and Diane Kitchen, among many others. According to Jordan, his students "wanted to do things that nobody had thought of. They were inventing things that were way beyond [the capacities of the faculty]. Everybody was learning from everybody else."⁵⁷

The general eagerness on behalf of the SFAI faculty and their students to push avant-garde filmmaking to its limits fostered an environment within which DIY technological innovation was considered valuable and exciting, with each new device representing an

opportunity to try something new. Whenever Jordan and his students conceived of an effect or technique to explore, they would take their ideas to Jaakko Kurhi. Kurhi, a Finnish immigrant who worked in the Bay Area, was a master machinist and licensed Bolex repair technician. Kurhi had been employed at the Bolex Factory in Switzerland, where he had been trained in adapting the company's 16mm cameras so that they could also shoot Double 8mm. He owned a machine shop in Oakland where he later operated Meritex, Inc., a company that produced surfboards.⁵⁸ Kurhi primarily did small manufacturing of various kinds, producing limited runs on a contractual basis. Although he was something of a jack-of-all-trades, his education at Bolex made him predisposed to work with film technology. Jordan explains:

My graduate students and I would keep going to Jaakko to try to make gadgets. He would build this and build that, and he would build things for my [personal] animation stand. He was very accommodating, and he could always do it. Just describe what you needed, and he'd build it! He was making these gadgets for us, so he knew that we were trying to rephotograph. And, finally, it got to the point where everybody just knew that he had to build an optical printer.⁵⁹

Although Jordan did not use optical printing for his own films, preferring the crisp look of a first generation image, it seemed like the next logical piece of equipment for Kurhi to build. Jordan drafted a list of requirements, a “wish list” of features that were most important to him and his students in an optical printer. Jordan gave the list to Gary Richardson, a student from an earlier teaching stint at California College of the Arts, who lived in Oakland and had worked with Kurhi on an animation stand. From Jordan's sketch, Kurhi set to work on the prototype for the JK.

In the patent that he filed, Kurhi stated his goals: “To provide an optical printer which is reliable, easy to operate, has extremely accurate picture centering means and is relatively inexpensive so that it can be purchased by individual filmmakers and film teaching schools.”⁶⁰ The resultant model, the K103, was rudimentary in comparison to a professional printer like an Acme-Dunn or an Oxberry, but it was more reliable than most of the homemade printers that

filmmakers were fashioning at the time. Kurhi was able to keep costs low by eliminating the Geneva drive or Maltese cross, a gear mechanism used in motion picture projectors to convert continuous movement into intermittent movement. This allowed film to be held in the gate without slipping or strobing during rephotography. Kurhi's printer used a step motor to advance the film through completely intermittent movement. Although this was a more laborious, time-consuming process, it eliminated a number of expensive parts, which allowed the printer to be manufactured at low cost. The K103 came equipped with other features, including a 300-watt ELH lamp, a 50mm lens, a bellows for magnification and reduction, and a control keyboard for the step motor. Filmmakers could replace many of the pieces at their discretion.

Kurhi initially made ten printers, which he sold to local institutions and individual filmmakers, including SFAI and California College of the Arts. As word of mouth began to spread, he began to receive orders for more printers, both within the Bay area and around the country.⁶¹ In April 1972, Kurhi took out advertisements in *American Cinematographer* and *Filmmakers Newsletter* trumpeting the phenomenally low price of the K103, which was initially sold for only \$550 (\$3,100 in 2015).⁶² As Kurhi continued to improve his design, the cost of the printers gradually increased, although the price remained under \$1,000 throughout the decade; by contrast, an Acme-Dunn printer cost \$75,000 in 1981 (\$204,000 in 2015).⁶³ Fortuitously, Kurhi's invention coincided with the institutionalization of the avant-garde in the 1970s. As avant-garde filmmakers took up residency in film production departments around the country, departmental budgets could be allocated to film equipment. Soon the K103 and its descendant, the K104, were recognized by colleges and universities as a basic instructional tool. Moreover, students were allowed access and given instruction on the device's technical and aesthetic capabilities. In addition to SFAI and CalArts, the optical printer became a staple of the BFA and MFA

curriculum in places like Chicago (the School of the Art Institute), Milwaukee (The University of Wisconsin-Milwaukee), Boston (MassArt), Boulder (The University of Colorado-Boulder), and Binghamton (SUNY Binghamton).

To some degree, the JK standardized low-budget optical printing in avant-garde circles. The case of Bill Brand is representative. Since the early 1970s, Brand had been incorporating rephotography into his films, mostly inventing one-off machines for the specific purposes of a single film. In 1975, he was lured to the School of the Art Institute, where he was told they possessed an optical printer; upon arrival, however, he realized that he had in effect been recruited to build one. Later in the year, he was invited to screen his films at Pittsburgh Filmmakers, where he encountered their newly purchased K103. “That was it,” Brand later recalled. “I messed around with that JK printer for awhile, and decided, ‘I have got to get one of these!’”⁶⁴ Shortly thereafter, Brand purchased his own printer from Kurhi directly. In addition to making some of his most well-known films on the printer, including *Works in the Field* (1978) and *Split Decision* (1979), Brand began doing favors for other avant-garde filmmakers, optically blowing up their 8mm films to 16mm. Under the aegis of BB Optics, Brand has worked with hundreds of avant-garde, independent, and documentary filmmakers on optical effects, blow-ups, and restorations.⁶⁵

Film cooperatives also benefited from the JK optical printer. Early in 1977, Howard Guttenplan, the Director of Millennium Film Workshop, fulfilled Gary Smith’s promise from ten years earlier that “all that machinery will be ours someday” when he purchased a K103, a module for use with Super-8, a quartz lamp system, and a collection of color correction and neutral density filters for a combined total of \$1,900 (\$7,700 in 2015).⁶⁶ He also enlisted Boris Bode to teach a weekly class at Millennium on how to use the printer. (This class was later

taught by filmmakers Michael Gitlin and Su Friedrich.) “It can be quite precise, once you get used to it,” Guttenplan observed, in a statement echoed by most filmmakers who had experience with the JK.⁶⁷ When Stan Brakhage visited Millennium in 1977, Guttenplan expressed excitement over the JK and provided him with a copy of the instructions.⁶⁸ Although Brakhage would not work with the printer until the 1990s, Guttenplan’s gesture is indicative of the word-of-mouth proliferation of interest in the optical printer at the time. With the widespread availability of the JK printer, it became possible for a filmmaker to define himself or herself an optical printer filmmaker, someone whose practice was characterized by a particular set of aesthetic concerns. But what were these concerns, and what were their formal and conceptual ramifications?

Optical Printing: Theory and Practice

At first glance, Craig Baldwin’s *Wild Gunman* (1978) resembles an early Bruce Conner film: Found footage B-roll of Western outlaws and advertising films collide in a dizzying indictment of westward expansion, masculinity, and the genocidal underpinning of American history. Upon closer examination, the film seems as much an autopsy as an indictment. Shots are repeated ad nauseam; it appears that no matter how hard he tries, the cowboy may never be able to dismount his horse or pry his six-shooter from his holster. The images stem from a participatory video game in which players shoot at their screens, but the game has acquired a nervous tic, as though suffering a breakdown.⁶⁹ Video game logic impels the viewer to “play” the game again and again, but it is out of his control—the footage is run backward, slowed to a crawl, and details are isolated for closer scrutiny. In short, juxtaposition has given way to dissection, as the footage is pulled apart and put back together again on the optical printer.

Where Conner freewheels, Baldwin stutters, retaining his found footage's semiotic resonance but forcing it to undergo a qualitative change. These dual emphases on defamiliarization and dissection are fundamental to the optical printing aesthetic, and both impulses have mutually reinforcing practical and theoretical implications.

It is possible to distinguish between two approaches to optical printing in the avant-garde, although a filmmaker may adopt both, sometimes within the same film. In the analytic mode, the printer is used as a functional tool for dissecting images. This is a primarily intellectual approach, evidencing a tendency towards loop printing and repetition, breaking down movements and gestures, permutational and/or grid-like schemas, and language-based systems that seems a direct inheritance from the Structural legacy (although the films themselves resist strict classification as "Structural Films"). The defamiliarizing mode is more experiential, piling effects on top of each other to transform the images. This emphasis on perceptual renewal and metamorphosis shares a pedigree with West Coast-inflected Expanded Cinema, and it typically demands a more immersive, comprehensive knowledge of the printer's possibilities.⁷⁰ The intent with these classifications is not to label particular films or filmmakers, but to recognize that these two tendencies work in tandem.

Keeping these tendencies in mind, what kinds of effects do avant-garde filmmakers regularly use the printer to achieve, and what are some of the most canonical optically printed avant-garde films?⁷¹ As the example of *Wild Gunman* attests, scale changes through magnification or reduction are some of the most basic printing techniques. JK optical printers come equipped with a lens bellows that allows the filmmaker to modify the composition by increasing or decreasing the focal length in relation to the projector. By decreasing the focal length, the filmmaker can isolate a portion of the original frame, altering the sense of scale. In

Phil Solomon's *Psalm II: "Walking Distance"* (1999), described in detail in Chapter One, Solomon enlarges and cants a close-up of Tony Curtis's face from the film *Houdini* (1953). Solomon's chemical treatments and copper backlighting further defamiliarize the source material, and the three techniques used in conjunction eliminate any resemblance to Curtis, rendering the face a pockmarked specter of the original. On the other hand, increasing the focal length produces the opposite result, a frame-within-a-frame effect that will be addressed in greater detail in subsequent discussions of Peter Rose's *Analogies* (1977) and Su Friedrich's *Gently Down the Stream* (1981).

The optical printer can also be used to adjust the speed (and, therefore, rhythm) of the original in procedures referred to as skip or step printing. Skip printing, the less common variant, involves skipping frames during rephotography, which leads to fast and/or fragmented motion. Standish Lawder's *Intolerance (Abridged)* (1973) offers a schematic application of the technique. As its title suggests, the film is an abridged version of D.W. Griffith's *Intolerance* (1916), described by Lawder as "the most sacred monument in the history of film."⁷² Lawder made the film automatically by setting the sequencer on his homemade printer to photograph every 40th frame twice, condensing 176 minutes into five.⁷³ The images zip by at breakneck speed, prefiguring the fast forward button and the scroll bar. Griffith is often cited as the filmmaker most instrumental in advancing the concept of film as a storytelling device, but Lawder's ironic encapsulation wrenches the film from narrative's grasp, rearticulating it as purely visual sensation. The skip printing functions as an experiment in how much visual information the eye can grasp in a two-frame segment of film. How much narrative is enough?

In step printing, the filmmaker decelerates motion by rephotographing each frame multiple times. The degree of retardation is often expressed as a ratio; a 3:1 ratio, for instance, means that

each frame has been photographed three times. Step printing provides a slightly different effect from slow motion, whether achieved by changing the camera speed or adjusting a clip's duration in an editing program. Because each frame is reproduced in duplicate or triplicate, step printing retains a slideshow quality—even when moving at a brisk rate, the images sometimes feel held on the screen. When different ratios are combined, the filmmaker can impose rhythm onto the footage, accelerating and decelerating in an improvisational or tightly regimented dance. This makes step printing particularly appealing for filmmakers who paint or scratch directly onto the filmstrip. In a handpainted film, the rate of change between one frame and the next is often so pronounced that watching the images in projection becomes a perceptually overwhelming experience, which can lead to monotony. Step printing the images provides an opportunity to vary the rhythm, as well as to savor the ornate and frequently beautiful compositions on each frame.

This observation is borne out by Caroline Avery's *Midweekend* (1985), a collage film that intersperses handpainted passages with unsplit 8mm frames culled from educational and travel films. Both the painted and found material is step printed with a mix of ratios (mostly 2:1 and 3:1). These sudden shifts of rhythm lend the film a jerky quality, like a slideshow with an unreliable advancement mechanism. Avery's painting is globular and celestial, resembling both a blastula under a microscope and a vision of the cosmos. The 3:1 ratio provides a (slightly) longer amount of time to linger on each painted frame. In contrast to some of Brakhage's handpainted films, where the painting is experienced as hurtling movement, *Midweekend* encourages the viewer to take in each composition. Of course, step printing a single frame of found footage results in a still image or freeze frame, so the documentary images (of kids getting out of school or a hospital orderly pushing a gurney) feel like interjections into the painted material, not an

organically moving whole. Consequently, Avery's step printing introduces a nervous presentationalism that informs the viewer's orientation toward the footage.

In addition to altering composition and movement, a filmmaker can also use an optical printer to change the visual qualities of the images, primarily through a combination of lighting and coloring techniques. This is an important component of the films produced at the University of Colorado in the 1990s, especially those of Solomon, Brakhage, and Mary Beth Reed. Because the printer backlights the original, it often provides the sensation that images—whether photographic, painted, or chemically altered—are illuminated from within. By redirecting the angle of light or blocking it with fingers, the filmmaker can change the image's appearance. Using colored filters can provide a unifying hue, as in Solomon's "blue films," *What's Out Tonight Is Lost* (1983) and *The Exquisite Hour* (1989). Shooting with prismatic lenses or keeping the shutter open between frames during rephotography will blur or streak the image, while holding one filmstrip in front of the other will slightly offset them. These methods are maximized for expressive effect in Reed's *Floating Under a Honey Tree* (1999), in which a young girl on a bench and bees crawling over a honeycomb are imbued with a dreamlike ambience. In this instance, footage that would appear fairly commonplace in another context acquires an auratic and immersive obscurity.⁷⁴

In *Floating Under a Honey Tree*, Reed also bipacks her footage. Bipacking is a technique whereby two or more pieces of film are threaded in the printer gate with their emulsions touching. During rephotography, the sandwiched images are combined. While the effect is sometimes likened to double exposure or superimposition, the logic is precisely the opposite. In a superimposition, the overlap occurs in the lightest portions of the frame, but in bipacking, the darker areas add up for a much denser image. Therefore, a filmmaker who wanted to combine

lighter images would be drawn to bipacking to avoid washing out the image. In practice, a bipack can convey the uncanny sense that light is both additive and subtractive. Light is shining through the images, but two dark areas will serve as blockages or barriers.

The virtues of bipacking are evident in Stan Brakhage's handpainted *Coupling* (1999). One of his darkest painted films, *Coupling* features vein-like ligaments of red, orange, and green paint against a black background. The painting strongly recalls microscopic images of connective tissue or cells, which undulate in a shimmying dance that suggests sexual intercourse.

Throughout the film, Brakhage achieves startling effects by bipacking painted rolls so that one layer of paint seems to block another. Unlike other superimposed painted films, where it seems like light is shining through the image to illuminate the combinations, the top layer in *Coupling* seems to stop the light in its tracks, so that the bottom layer is viewed not through the top layer, but around it. True to Brakhage's intentions, bipacking emphasizes the paint as networked linkages of dendrites, like a glimpse inside a radiantly colored human body.

One of the most common uses of the optical printer is to combine two or more images through the use of mattes. In simplified form, one portion of the frame is rephotographed on the printer while the surrounding areas are blocked by a matte. After rewinding the camera, the filmmaker "protects" this portion by blocking it with another matte and exposes the area that was blocked on the first pass, resulting in a combination or composite. Mattes that mask the shapes of moving objects are called traveling mattes. This is a more refined skill that takes time and practice to master, but it has been used frequently by some of the most sophisticated practitioners of the optical printer. Pat O'Neill has virtually built an aesthetic out of combining incongruous elements through staggeringly complex traveling matte work. In a justly celebrated segment from *Foregrounds* (1979), a looped filmstrip is inserted into a shot of an overgrown garden. As it

hangs from a tree branch, the viewer gradually discerns that the frames on the strip are teeming with movement, as though each frame is playing out its own private black-and-white movie against a verdant backdrop.

While O'Neill often works in defamiliarizing mode, juxtaposing irreconcilable imagery to surreal and humorous effect, the optical printer's capacity for repetition, multiple passes, and combinatory logic also lends itself to the analytic mode. Peter Rose's *Analogies: studies in the movement of time* (1977) was filmed at the Pratt Institute in Brooklyn, where Rose was teaching. The film rigorously partitions time and space through a diachronic presentation of multiple stages of an event, achieved by slotting images into grids of increasing complexity. Employing a gestural handheld camera, Rose explores the institutional space of Pratt's basement, with its perspective-laden hallways and spare, colored walls. Physical movements down corridors, hallways, and stairwells—along with the passing of students into and out of the frame—are then slotted into small boxes and put on a time delay, so that several aspects of a movement are presented simultaneously. As the grids develop from three to six to 25 separate boxes, staged events, like a student running down a hallway, reverberate through the grid. As Noël Carroll suggests, the experience is something like music: "An image ripples across the screen as a theme echoes across the instruments of an orchestra, giving way to complicated designs, each image an arabesque in a Persian rug."⁷⁵

Analogies would be impossible to realize without an optical printer. Rose conceived of the idea in the mid-1960s but lacked a means to pursue it until he and his father invented a machine they called the Synchronopticon, which synched a projector with a Beaulieu 16mm camera through light sensors and circuits. Described by Rose:

Essentially the way it worked was that when the rotating shutter in the projector cleared the frame a signal was sent to the camera, turning it on, and a small mirror

mounted on the sync shaft of the camera told the system when the frame in the camera had been taken and that turned the camera off. The two chugged along at around six frames per second.⁷⁶

During the printing, Rose drafted elaborate shooting diagrams to keep track of the permutations in the image—shoot every third frame twice, skip every fifth frame, etc. The camera was mounted onto a platform that would move horizontally and vertically. Working one frame at a time, Rose painstakingly slotted each image into the grid, rewinding the camera and projector with each pass. The result is a perfect encapsulation of a film that works in both the analytic and defamiliarizing modes. Space and time are carved into slices and stacked in layers according to a meticulous set of formulas, but the finished product suggests movement as an ornate tapestry of gesture and sensation, like a dance film conceived by a mathematician.

With its schematic investigation of space and time, the two defining attributes of the cinematic image, *Analogies* suggests a link with Structural Film. First defined by P. Adams Sitney, this mode of avant-garde filmmaking became associated with characteristics such as a fixed camera position, loop printing, and immersion in language-based gamesmanship, which reflexively highlighted certain ontological aspects of the cinematic medium.⁷⁷ Without necessarily self-defining as Structuralists, some filmmakers began to use optical printing in the analytic mode to explore cinematic specificity within a coherent and ordered formal system. Consider Ken Kobland's *Frame* (1976), which begins with a POV shot through a windshield, as a car drives down a strongly perspectival street lined with row houses and telephone poles. (Later in the film, the image switches to the horizontal passing of row houses out the rear driver's side window.) Using a matte process, Kobland inserts a smaller square into the center of the frame containing the same driving footage, but with some formal parameter (motion, scale, directionality, brightness) manipulated, effectively staging a confrontation between two different

iterations of the same footage.

Explanatory title cards cue the viewer to anticipate the logic of each impending juxtaposition: “The inner image is delayed,” “The images pass at the same speed, but still in opposite directions,” “The center image is flipped, appears as the reverse of the outer and is out of sync with the fade cycle.” In some instances, Kobland cannily subverts expectation by calling attention to content instead of form. For example, one title informs us that the upcoming shot will briefly feature a glimpse of a flying gull. In *Frame*, Kobland uses the optical printer’s ability to combine multiple images with a high degree of precision to invent a participatory game. Like Hollis Frampton’s *Zorns Lemma* (1970), the film habituates the viewer to an interactive process whereby his or her expectations are continuously subject to revision. In addition, *Frame* becomes a systematic demonstration of the cinema’s depiction of space, as the perspectival shots and their flattened, two-dimensional counterparts vie for the frame. In terms of both its aesthetic and conceptual preoccupations, *Frame* is inseparable from the optical printer’s aptitude for repeating and combining multiple assortments of images. Consequently, it served as an important tool for many filmmakers associated with Structural Film.⁷⁸

Like the rest of the films discussed in this chapter, *Frame* was made one frame at a time. The specificities of optical printing technology force the filmmaker to view, consider, and adjust each frame, which can be both an asset and a liability. Phil Solomon dramatizes the process as both thrilling and dangerous: “When peering down the dark and lonely hallways of the optical printer camera, gazing at the beam-splattered shunted light, awaiting the beautiful ballroom entrance of every pulled down frame, one must automatically struggle against the seduction of the fascinating single image.”⁷⁹ Solomon’s characterization recalls Norman McLaren’s famous definition of animation as “the art of manipulating the invisible interstices that lie between

frames.”⁸⁰ In both animation and optical printing, the frame becomes the basic unit of syntax as filmmakers work meticulously in increments that expand into a totality.

In this regard, optical printing can be viewed as a practice-based, technologically determined correlate to more general theoretical interest in the frame. The most influential exponent of frame-based cinematic practice in the avant-garde is the Austrian filmmaker Peter Kubelka. Famously, Kubelka advocated for a metrical cinema rooted in the economy of still frames. In a revision of Eisenstein, who posited that meaning in cinema is constructed between shots, Kubelka seized upon the fact that each frame hits the screen when projected, which generates a basic rhythm that one could feel in his or her body. Kubelka privileges “strong articulations,” or successive frames with a high degree of difference, over “weak articulations,” which squander much of their communicative potential due to their similarity. Perhaps the most dramatic instantiation of Kubelka’s theory is *Arnulf Rainer* (1960), composed entirely of frames of black or clear leader—a series of strong articulations that virtually crash into the screen when projected.⁸¹

Kubelka wasn’t the only filmmaker to realize the potential of the single frame. Robert Breer’s *Recreation* (1956) is comprised of over 1,500 images, but its runtime is only slightly over one minute. Breer exposed his film one frame at a time, as in traditional animation, but each frame was as unlike the preceding one as possible. Therefore, Breer subverts the aims of commercial animation—to represent natural movement through gradual modification of forms—by changing the goal entirely. In a different vein, Gregory Markopoulos was developing his own frame-centric theory of cinema, which involved the construction of short film phrases (one to three frames long) that evoked “thought-images,” which he considered analogous to the harmonic units found in musical composition.⁸² To be clear, Kubelka, Breer, and Markopoulos

did not work with optical printers, nor could their writings or films anticipate the widespread adoption of the printer within the avant-garde. But their work did establish a single-frame discourse that the practice of optical printing only helped to solidify.

The concentration and precision demanded by optical printing necessarily entails a long, solitary, and detail-oriented working process. While this could be rewarding, it could also be grueling; Peter Rose describes optical printing as “compulsive and fussy,” while Su Friedrich acknowledges that the final shot of *Sink or Swim* (1990), which involves multi-layered images of a young Friedrich waving to the camera, was a “big pain” to execute.⁸³ On the other hand, the reclusiveness of the printer could lead to reflection and an increased awareness of film’s materiality. Julie Murray, who used a homemade optical printer on *If You Stand with Your Back to the Slowing of the Speed of Light in Water* (1997), recalled:

I found I didn’t get bored spending hours and hours poring over images and sequences of images, constructing and deconstructing fleeting narratives—some taking place between a couple of frames; at times—gazing at rows of images—one hardly different from the next in a sequence—and meditating on such metaphysical questions (as only the under-employed can usefully indulge in) as to just how much time one could say, while holding the strip of film between their fingers, had passed between them right there in their plastic present tense. I imagine knitters, weavers and other practitioners of the tactile arts think these things too.⁸⁴

Also inherent to the optical printing process is the dialectic between planning and improvisation. As might be expected, working one frame at a time allows filmmakers a higher degree of control over their images. Specific effects can be worked out in advance, and complicated maneuvers, like those in *Analogies* or *Foregrounds*, can be executed after-the-fact in a contained environment. On the other hand, the printer can also lead to experimentation or “happy accidents,” as a filmmaker might seize upon a particularly striking frame or effect and decide to pursue it. For instance, Barbara Hammer’s *Place Mattes* (1987) entails the use of traveling mattes, for which Hammer needed to count frames, test for exposure, and keep

extensive notation. In a different section of the film, however, Hammer places typewriter ribbon directly in the gate of the printer, stretching out the text, shooting it sideways, and exposing it to other forms of manipulation while rephotographing. For this portion, Hammer was free to work intuitively, trying out different patterns and rhythms.⁸⁵

As will be discussed, Hammer's work tapped into a DIY optical printing movement that corresponded with the "minor cinema" generation, freely combining poetic, Structural, and political approaches. Su Friedrich's *Gently Down the Stream* and Martin Arnold's *Pièce Touchée* (1989) and *Passage à l'acte* (1993) demonstrate the ways in which artists work with the optical printer to address social and cultural concerns while remaining mindful of the formal lineages of avant-garde cinema. For viewers unfamiliar with the conceit of *Gently Down the Stream*, the film can seem remarkably opaque. It begins with successive panels of text scratched into black leader: "Wander through large quiet rooms," followed by black-and-white stills of statuesque women in ornate headwear.⁸⁶ The images are blurred and streaked, insistently fluttering, as though the film is losing registration in the gate. The text continues, telling an enigmatic story about meeting an old friend and informing her that weavers worked as slaves to make rugs, which prompts an outburst about spoiling "everything that is pure civilization." At one point, the text is crossed out, distorted, streaked, and edited into rapid bursts. We see stark, high-contrast black-and-white images of nuns and a statue of Jesus before more clipped text appears:

Walk into church
My mother trembles
trances
reciting a prayer about orgasm
I start to weep

While the text seems like obscure poetry, it has been sourced from Friedrich's dream journals. The film consists of condensed, epigrammatic renderings of twelve of Friedrich's

dreams, which are punctuated by fairly minimal visual reinforcement—a few images, leader, and hole punching and scratching.⁸⁷ At the level of text and image interaction, Friedrich subverts expectations in two ways. First, the images do not illustrate the content of the dreams, but instead provide elliptical metaphors for Friedrich’s process of investigating her own subconscious on film. Second, the text is treated as the dominant element, while the images hover in the background, used mostly for punctuation.

In terms of their content, the dreams are often bizarre and startling. Consider two more examples:

I make a second
vagina
beside my first one

I look in surprise

Which
is the original?

I lie in a gutter
giving birth to myself
two fetuses dark green and
knotted up
Try to breathe so they don't
suffocate
I can pull one out
but it starts to crumble up

In the film’s middle section, where these texts appear, the most frequent images are stuttering, repetitive shots of women exercising on a rowing machine and in an indoor pool, which Bruce Jenkins has pointed out to be puns on “exercise”/“exorcise.”⁸⁸ These are often slotted into smaller boxes against black leader as a frame-within-a-frame effect. Sometimes these are freeze frames, as in the still image of the swimmer poised to slip into the water during the sixth dream, but elsewhere they appear in motion, as in the fluid exercising of the swimmer and rower during

the seventh dream. Toward the end of the film, the images shift from exercise to a series of high-contrast shots taken from a boat; we see the horizon line, the light glinting off the water, and waves washing up onshore. In the final dream, Friedrich distresses the film by perforating it with a hole punch and carving it up with an engraver's tool.

In *Gently Down the Stream*, Friedrich uses the optical printer to generate four mutually reinforcing effects. When the content of the dreams references men's actions, Friedrich scratches each word once and rephotographs it in the optical printer, which lends the text a steady, unwavering quality. For the texts about women, she does not use the printer at all, repeatedly scratching each word onto eighteen consecutive frames. This generates a fluttery, shifting scroll—familiar to avant-garde viewers from Brakhage's distinctive handscratched titles.⁸⁹ The streaking of both text and image in the opening section is the result of deliberately disengaging the printer's registration pins. As demonstrated by *Analogies* and *Frame*, the frame-within-a-frame effect is a common usage of the optical printer, one of many devices in *Gently Down the Stream* to reference Structural Film. And finally, the images are often step printed or turned into freeze frames, which lends the film a jerky, analytic sense of rhythm, as though it is stopping and suddenly starting up again.

As the film began to take shape, Friedrich knew that she wanted to render the dreams as textual fragments, but this posed some obstacles. On the one hand, making text promised to be a laborious process, which would likely involve typesetting. On the other was the problem of keeping the text from becoming subsumed by the image. As Friedrich puzzled over these difficulties, she made an accidental discovery on the optical printer at Millennium Film Workshop. Several years prior, Friedrich had taken Millennium's optical printing class, taught by Boris Bode, and had used their JK Printer for a few isolated incidents of slow motion and to

blow up earlier films from Super-8 to 16mm. During one of these blow-ups, she inadvertently produced the frame-within-a-frame effect by failing to zoom in enough to gain a full-frame reproduction. Upon review, it occurred to Friedrich that this effect would enable her to scratch the text directly into the emulsion without having to worry about “losing” it inside a full frame image.

In *Gently Down the Stream*, Friedrich works mostly in the analytic mode, using the optical printer to dissect both her own dreams and the formal relationship between text and image. The film provides a sophisticated example of multiple effects interacting—the interplay between text, frame-within-a-frame, streaking, and slow motion/freeze frames could only be achieved on an optical printer. It also becomes apparent that for Friedrich, the optical printer is a tool for examining her own emotions, not a musical instrument to be played for its own sake. In Friedrich’s hands, the printer provides a means for excavating her personal history, and the process of working with it is analogous to the process of working through her dreams. In this light, the images of women methodically rowing or swimming serve as metaphors for Friedrich at her optical printer, searching for enlightenment through dogged persistence.

If Su Friedrich’s use of the optical printer is functional, Austrian filmmaker Martin Arnold’s approach could be described as immersive.⁹⁰ In *Pièce Touchée* and *Passage à l’acte*, both made on a homemade optical printer, Arnold painstakingly rephotographs brief snippets from classical era Hollywood cinema one frame at a time.⁹¹ Arnold duplicates the frames in an approximate “one step forward, one step back” pattern, which results in a stuttering, neurotic echo chamber, as though the actors are determined to get somewhere but are stuck inside the apparatus, ferociously reverberating inside a broken machine. The fact that the participants seem to be suffering from an attack of visual and aural tics has led many commentators, including

Arnold himself, to read the films psychoanalytically.⁹² But in Arnold's sophisticated use of the optical printer, the films also suggest some of the ways that avant-garde filmmakers turn Hollywood's tools against itself to unmask ingrained social and formal codes.

In an interview with Scott MacDonald, Arnold describes the events that led him to the complex printing process that he devised for *Pièce Touchée*. He discusses his obsessive deconstruction of an eighteen-second passage from *The Human Jungle* (1954), which resulted in 148,000 single images and a 200-page score. He also makes it clear that the film took shape through a process of trial-and-error:

At the beginning, I tried out certain forward and backward movements. Naturally most of the material produced was trash, but I repeatedly corrected and expanded the more promising passages. Also, I continued to search through the original footage for all manner of implications and possibilities... I was never tempted to exercise any kind of conceptual art: that is, to think up an abstract system into which I would fit the images.⁹³

In other words, Arnold's approach to the optical printer is exploratory and truly experimental, in the sense that he tries out particular frame configurations on the possibility that they are promising candidates for expansion. Arnold characterizes his process as a search through his footage, as though the printer provides access to the space inside the frames, where he can go exploring. His unwillingness to use a conceptual schema to generate the patterns illustrates that Arnold has absorbed the frame-by-frame logic of Structural Film without adhering to its more rigid applications.

Passage à l'acte would be as laborious (and futile) to describe as the movements of its characters, but a close analysis of the first minute or so in relation to the specific frame configurations Arnold uses provides some insight into his use of the optical printer. As is well known, the source material is the breakfast table scene from Robert Mulligan's *To Kill a Mockingbird* (1962), although the general sense of domesticity and audiovisual density of the

scene are arguably more important than the issues of race and class commonly associated with Harper Lee's story. In the foreground, Atticus and Miss Maudie are seated side-by-side at the far side of the table. Jem is positioned at the table's right side, and Scout (in her new dress) is seen from behind, facing her father.

The film opens with Jem leaping from the table and making a beeline for the screen door. "Oh, Jem!" Atticus calls to him, but Jem is banging wildly into the door, like a caricature of a mental patient. The sound is a repetitive, machine-gun rattle. Jem's lurches seem the cause of Scout's chicken-wing arm flutter and Maudie's convulsively unsuccessful attempt to drink her coffee. Jem manages to slide out, but the door continues to open and close in his absence while the rest of the family twitches nervously. Everyone is stalled for what seems like a hopelessly long time before the spell is broken. Atticus is trying to repeat Jem's name, but he can't get it out: "Je-Je-Je-Je-Je..." As the frame patterns mutate, the syllable twists into unrecognizability, both angry ejaculation and intergalactic transmission. (Viewing the original scene reveals that Arnold gets a lot of aural mileage out of the deep, mumbled baritone of Gregory Peck's Southern accent.) Scout catatonically rocks back and forth, while Maudie's head pitches forward, jaw locked tightly in place.

Arnold's process involves rephotographing strings of consecutive frames on the optical printer. He explains, "I work with more-or-less continuous forward and backward motion. I start with frame x, go forward to frame x+1 and then from x+1 back again through x to x-1."⁹⁴ Arnold's description is true in principle, but the patterns are actually more complicated. Take, for example, the opening 35 seconds. The template for Jem's frustrated collision with the door is rendered through the patterned rephotography of specific frames:⁹⁵

frames: 24, 25, 26, 27, 25, 23, 24, 25, 26 [repeat 8 times]

The schema for the door's jittery banging after Jem leaves is more straightforward:

frames: 46, 47, 48

[repeat 161 times]

These brief examples suggest that Arnold's technique is more accurately described as the repetition of patterned frame configurations. In the first instance, four frames of fluid motion are retarded by the insertion of one jumbled frame (25) before playing out again with an extra frame at the front (23) and one truncated at the end (27). After a sufficient number of repetitions, the pattern will vary slightly or be supplanted, giving birth to a new configuration. Furthermore, Arnold's manipulation only exists in relation to the original. He must include several runs of consecutive frames for fluid motion to register, which is then disrupted by patterned repetition. Stated simply, the stuttering is only possible in conjunction with a threshold of stability.

In Chapter One, I argued that avant-garde filmmakers' work with the filmstrip's emulsion illuminates a paradoxical belief in the image as both revelatory and mediated. This is true of Arnold's process, which is rooted in the idea that the technology produces material traces of ideology. He explains:

When you look at a strip of film you will at first see a regular sequence of rectangular frames that represent a three-dimensional space. Those are the tracks the camera left behind; the apparatus inscribed itself onto the material. If you look more closely "into" the frame, you will see tracks of the people and objects that were in front of the camera at the time of the recording... In commercial-narrative movies an industry inscribes its actors, modes of representation, and stories into the material. It is here that the tradition of representation is being written, and those cultural idols, Man and Woman, and their ideal life together are being established.⁹⁶

Like chemical treatments, the optical printer becomes a conjuring device, capable of breaking into the frames and exposing their codes from the inside out. In *Pièce Touchée* and *Passage à l'acte*, the grotesque distortion of social and gender norms is immediately apparent. Subtler is Arnold's deconstruction of Hollywood's formal codes, the ways in which shot/reverse shot or a panning movement can be made to seem components of an arbitrary system.

This same idea—Hollywood’s seamless diegesis as an arbitrary construction—is central to the films of Pat O’Neill, one of the first and most influential avant-garde filmmakers to work with the optical printer. It would hardly be an exaggeration to state that O’Neill’s work inspired most of the filmmakers under discussion, effectively putting the optical printer on the map for a whole generation of artists. Although his work is not exactly typical of the avant-garde’s use of the printer, it does highlight the tension between improvisation and execution, a painstaking working process that operates at the level of the frame, and the dialectic between analysis and defamiliarization. Moreover, O’Neill’s early association with the advanced amateur, DIY West Coast tech scene in the 1960s, as well as subsequent interaction with the studios, provides additional context for the avant-garde’s adoption of optical printing.

Pat O’Neill: The Technology of Transformation

Within the avant-garde, Pat O’Neill has become virtually synonymous with optical printing. As Paul Arthur has observed, the optical printer plays the same role in O’Neill’s cinema as the splice does for Brakhage or camera movement for Michael Snow—as a formal device with epistemological underpinnings.⁹⁷ As an early adopter, O’Neill demonstrated the potential of the optical printer for avant-garde filmmaking: that effects could be combined to form an entirely synthetic diegesis, defamiliarizing the source material to the point of unrecognizability. Connected to the Hollywood special effects industry, O’Neill possessed a level of technical expertise that flew in the face of the amateur discourses circulating within the avant-garde.⁹⁸ His cinema flirted with the effects-laden aesthetic of contemporary Hollywood while rejecting most of its functional objectives. Furthermore, O’Neill works a groove with his printer the way a jazz musician works a groove with his saxophone. In his hands, the printer does not seem like a tool

for securing a predetermined result, but an instrument that can produce a range of tones.

O'Neill's work with the optical printer has a number of relevant contexts, including his background in graphic design and interest in static collage. In this section, a close analysis of *Saugus Series* serves to illustrate the combinatory powers of the optical printer, its connections to the West Coast tech scene of the 1960s, and the avant-garde's innovative approach to the process of creating technologically based, perceptually transformative works of art.

O'Neill's 1970s-era films are difficult to categorize. Playful and witty, they are filled with visual contradictions and impossible arrangements, often hinting at narrative but remaining mostly inscrutable. Combining original and found footage, often in conjunction with solarization and time-lapse photography, the most persistent technique is the use of traveling mattes to juxtapose incongruous elements, often subverting the viewer's expectations about scale, resemblance, and complementary objects. This takes many forms: monochromatic blocks of color obscuring the image in *Runs Good* (1970), abstract confetti-like animation in *Screen* (1969) and *Sidewinder's Delta* (1976), and surrealist dreamscapes, such as three multi-colored "tar popsicles" resting in front of a mountain backdrop in *Saugus Series*, to cite a few examples.

Moreover, O'Neill's major films of the 1970s can be roughly divided into two phases.⁹⁹ *Runs Good*, *Easyout* (1971), and *Downwind* (1973) rely more heavily on solarization, satirization of consumer culture through Bruce Conner-influenced montage, and narrative gestures. In *Easyout*, for instance, title cards with phrases like "Meanwhile..." and "Several days later..." tease us with the unrealized possibility of temporal and causal ordering, while a talk show pundit is mocked by a gloved hand that makes "blah blah blah" motions during his (unheard) oration. By contrast, *Saugus Series*, *Sidewinder's Delta* and *Foregrounds* (1979) proceed in modular units or segments of discrete compositional "pieces." O'Neill has observed that these films were

simply groups of experiments strung together:

The individual parts were all made separately, so the film is not cohesive unless you can see it as a kind of journal, a collection of entries all by the same person but at different times and places... All the time I was doing them, I was thinking about ... a way to present film that was completely non-theatrical and non-sequential, that did not rely on any connection between its parts.”¹⁰⁰

This deliberate lack of cohesion has occasionally been cited as a detriment by those who see O’Neill’s work as a series of technical experiments without form. P. Adams Sitney writes, “One strains in vain to find a unity to the ‘series’ aside from the obvious invention of the imagery.”¹⁰¹

O’Neill’s many champions, however, argue that his films amount to much more than technical exercises. Analysis of O’Neill’s early period tends to focus upon his recombination of images for the purposes of visual contradiction, which opens up a multiplicity of meanings as incongruously juxtaposed objects undergo strange transformations. Christine Noll Brinckmann and Grahame Weinbren, for instance, have written a series of detailed analyses of O’Neill’s films, paying particular attention to his elimination or flattening of visual space, usually in service of a medium-specific denial of illusionism.¹⁰² Paul Arthur, Scott MacDonald, and David E. James, on the other hand, have illuminated O’Neill’s complicated treatment of the southern California landscape, especially in terms of his relationship to the industry and its technology.¹⁰³ Each approach leads to methodological differences. Brinckmann and Weinbren favor close analysis and thick description to account for O’Neill’s films on a moment-to-moment basis, teasing out their paradoxes and contradictions in the process. The others marshal contextual approaches that situate O’Neill’s films within other filmmaking traditions, especially the landscape film and the Los Angeles-based industry.

This analysis draws from both of these approaches to focus on O’Neill’s use of the optical printer. This entails examining the films in terms of a constellation of interrelated factors.

First, O'Neill's background in graphic design is particularly germane, especially in his use of color, line, and shape. In O'Neill's work, this is not solely a question of aesthetics, but also of engineering: How does O'Neill gather disparate materials and use the optical printer to forge a striking design from them, brick-by-brick? O'Neill's process involves gathering raw material for subsequent manipulation and recombination; later, the film is composed on the printer at the level of the frame, using the device to arrange a precise set of encounters between objects instead of shooting a profilmic scene out in the world. This emphasis on the single frame suggests O'Neill's interest in the static image. How can stills be transformed, Méliès-like, through magic? How can a well-timed trick blur the boundaries between static and moving images, and thereby reorient the viewer's perception?

Many of these concerns can be traced to O'Neill's background, which he has recounted at length in an interview with John G. Hanhardt.¹⁰⁴ As a teenager, O'Neill was an avid automobile builder, and he constructed at least three prototype model cars for the Fisher Body Craftsmen's Guild. His enthusiasm for designing cars led him to the graphic design program at UCLA, where he became enamored with Surrealism and other forms of art that liberated photography from its static, indexical nature. Shortly thereafter, O'Neill became involved in paracinema, including installations, Happenings, and the Single Wing Turquoise Bird, a psychedelic light show formed in Los Angeles in 1968. His interest in film loops and image processing resulted in the purchase of a contact printer to make *7362* (1967), an intensely processed film that makes heavy use of bilateral symmetry and bleeding, throbbing color. O'Neill identifies the connecting thread between all of these pursuits: "Basically I was moving shapes around. I wanted to do sculpture; I was having ideas in several media at the same time. I was very involved in making things, in learning about materials and processes. I took a similar approach to making movies."¹⁰⁵

These contexts can be expanded by an analysis of the first five segments of *Saugus Series*, one of O'Neill's most accomplished early films. The film was made in 16mm on an optical printer while O'Neill was teaching at UCLA, a few years before he started his own special effects business. It represents his departure from Conner-influenced montage to a more discrete modular structure. Of the film's architecture, O'Neill explains, "Around 1973 I became frustrated with my editing assumptions. In *Saugus* I wanted to make shots with a fixed number of elements that would be present from beginning to end. Each shot would stand as a separate entity."¹⁰⁶ The result, which unfolds in seven numbered sections and runs approximately 19 minutes, is a series of semi-autonomous segments, each of which foregrounds a particular aspect of O'Neill's practice.

In the first, we are presented with an extremely flat image that vaguely resembles a landscape. The background is a white piece of paper with a rectangle in the center; the rectangle has been spray-painted blue, and a stain emanates from it, resembling the trace of a peacock. Below lies a shaky horizontal line, which seems to outline the contours of a mountain range. In the foreground, a disproportionately large human finger, covered in sticky dark blue paint, slowly paints within the lines of the mountain range, filling it from left to right while a steady electronic pulse keeps time on the soundtrack. Across the span of three minutes, the stains in the background morph through a series of dissolves—the colors change and the shapes bleed into each other like an animated painting. Eventually, the background is overtaken completely by a slow dissolve to an actual landscape of a watery coastline shrouded in fog.

This segment is heavily indebted to O'Neill's background in graphic design. The combination of color, line, and shape dominate, providing only the outline of a landscape without any of its details. Like the photograph of the ocean waves at the end of Michael Snow's

Wavelength (1967), the image emphasizes the construction of three-dimensional space in cinema, revealing it to be a perspectival illusion. (In a reversal of Snow's film, O'Neill teases us by dissolving to an actual ocean landscape at the end.) O'Neill calls attention to the artist's role in creating such an image, with the movement of the finger suggesting a cinematic paint-by-numbers exercise. The segment strongly conveys the sense of an aesthetic design that has been engineered, manipulated by a visible hand. Later in the film, O'Neill inserts an audio clip of an art teacher describing shots like these: "Now, you might say this is an interesting sort of design, but after awhile, you become tired of looking at it, it would lack interest. And so the artist must always temper his repetition of movements of form with what might be called a certain amount of variety."

The idea of visual variety, especially as rendered by the process of making mattes on the optical printer, is central to O'Neill's oeuvre. According to O'Neill:

[I am interested in] the by-products of the processes of special-effects work. I mean the support materials, the off-screen stuff, never meant to be seen, that which undermines the illusion... For example, opaque black mattes, film used to hide part of an image so as to replace it with another, have a fascination that comes from their incomplete descriptiveness. The edges of shapes are hauntingly photographic, yet their center is vacant and flat. Characters are both knowable and invisible. This is a technology particular to a very specialized craft, which I am re-using, if you will, in the spirit of collage.¹⁰⁷

In keeping with O'Neill's foundation in graphic design, mattes are not used solely for combining images, but also as conceptual entities, placeholders for where the viewer would expect photographic imagery to be. Often in his films, matte lines, which are strenuously avoided in Hollywood special effects work, serve as strongly articulated barriers, outlines for images with highly mutable centers. In some sense, this aligns O'Neill with the earliest graphic filmmakers, such as Hans Richter and Viking Eggeling, who conceived of film as a medium suited to the interaction of line and shape in time. In this instance, one of the optical printer's most

fundamental capabilities is explored not only as an effect, but also as a concept.

The second segment is markedly different. In an underexposed shot, O'Neill, truncated at frame right so that only his hand is visible, cuts a log with a handsaw over a sawhorse. Dark shadows cover the image, gradually engulfing it. Their irregular movements and dense opacity suggest that they do not derive from the diegetic space but have been composited from some other footage. Irreconcilable images sporadically appear in a rectangle that occasionally pops up beneath the sawhorse: a man in a suit checking a ruler, ocean waves, marching feet, a car being taken apart. Meanwhile, a large white canvas is inserted underneath O'Neill's feet, where abstract patterns, grids, and splotchy animations wriggle. The scene ends when O'Neill finishes sawing.

In this segment, O'Neill uses the printer to destabilize an image slowly, piling on small inconsistencies to undercut the viewer's sense of order. Early in his career, O'Neill was a still photographer, and his interest in stasis carried over to his moving image work. "I got to thinking about the viewer's experience of the static image," he explains. "You also explore it. Usually there's an instinctive place to enter the composition and then move through it, experiencing the space. You begin to know the imagery and figure out what the tensions are in it."¹⁰⁸ In many respects, the dominant image of this segment—O'Neill sawing—represents a static, rhythmically paced foundation to which subtle manipulations are added. This action delineates the length of the segment; when O'Neill completes his task, the segment is over. Against this time-based, nearly static phenomenon, a more complex process-based technology, the optical printer, invades. Meanwhile, tensions mount between technology and nature. In the act of sawing, O'Neill provides a metaphor for process-based construction built around the simple technology of the handsaw. The overlaid shadows seem like a mechanically engineered riff on a naturally

occurring phenomenon. The images inside the rectangle stem from old movies and TV shows, fragments of contrived dramas that seem at odds with working in nature. Over time, that which seemed relatively static is transformed, like a magic trick that deftly overlays one sleight-of-hand with another.

In the third segment, a blatantly artificial composite shot depicts an impossible space. Two giant red boots hover above the desaturated, pockmarked ground. The synthetic shadow of a fern tree ominously hovers over them at frame right, while an incongruous palm frond, rendered in electric neon green, partially obscures them on the left. As the fern's shadow slides offscreen, the boots begin changing color, covered in pink and purple paint (eventually they take on the color of the ground itself). The sounds of wind rustling through trees and someone yelling indistinctly offscreen unite the third segment with the fourth. A small cutout in the shape of a potted plant with green leaves swaying inside of it is pasted onto a grainy, black-and-white overhead shot of a bucket. We look down into the bucket, but the plant is presented frontally, which confounds our sense of orientation. The sound of an airplane is heard, and piercing light (rendered in time-lapse) flits over the water in the bucket. The shape on the right suddenly transforms into an actual potted plant, which shoots forward on the z-axis, rocketing offscreen.

Both of these segments display O'Neill's propensity for surreal juxtaposition. Not only are the combinations incongruous—painted boots with palm and fern, overhead view with frontal view—but the removal of objects from their typical environments, disorienting sense of scale, and flagrant z-axis motion thwart the viewer's ability to cognitively map the space. This dramatically separates O'Neill's use of the printer from his Hollywood counterparts. Julie A. Turnock argues that Industrial Light and Magic, which dominated the special effects industry after *Star Wars* (1977) and *Close Encounters of the Third Kind* (1977), strived for a

photorealistic aesthetic in their use of optical effects. That is, standards of photographic realism were to be applied to fantastic material, so that, as Turnock writes, “every element should be in the proper perspective and in the right position in the frame, the compositing seams should not be visible, and all motion should look ‘natural’ to the eye.”¹⁰⁹ The viewer is thought to get the best of both worlds—a fantastical and immersive diegesis that also seems totally credible.

O’Neill, whose sideline work for the studios in this era thoroughly schooled him in the photorealist aesthetic (in fact, Turnock argues that he was a progenitor of this aesthetic), uses the same technology to subvert photorealism. His impossible, defamiliarized collages, complete with improper perspectives, transformations of scale, and visible matte lines, force the viewer to acknowledge the image as a construction. While the denial of illusionism is a hallmark of avant-garde cinema, O’Neill’s adoption of this trope seems less politically motivated and more attuned to the realities of process and craft. O’Neill does not seem to be giving the lie to the social or political content of images, but playfully demonstrating that special effects work constitutes a craft, which proceeds according to a set of highly arbitrary assumptions. O’Neill’s films seem to demonstrate an artist’s approach to the same basic toolkit.

O’Neill’s composite images also have roots in collage, an important avant-garde mode. Collage or assemblage filmmaking, however, is usually produced by two distinct methods. Filmmakers such as Harry Smith, Larry Jordan, and Lewis Klahr make actual collages on paper, which are then animated. By contrast, Bruce Conner, Chick Strand, and Craig Baldwin paste together found photographic images from disparate sources to forge a junk-shop aesthetic that creates meaning through juxtaposition.¹¹⁰ O’Neill departs from both strands by using the optical printer to generate a single composite image, the meaning often more graphic than conceptual. The pairing of the bucket with the potted plant, for instance, is a perceptual trick that plays with

z-axis movement and the illusion of depth through the observation that two objects sharing a graphic and functional similarity look so incongruous when viewed from different angles.

The busy fifth segment of *Saugus Series* integrates almost all of O'Neill's aesthetic preoccupations. At the center of the frame hovers the forked end of a branch, tinted bluish grey and detached from its surroundings. The white background is covered in simple line drawings of mechanical parts, as though lifted from a blueprint. These drawings are replaced by others in a randomly generated substitution pattern, while bright specks of color, like confetti, flit wildly across the image. In the upper right-hand corner, the white background appears to have been torn, like a piece of paper, revealing a tiny portion of an old black-and-white movie playing underneath. The tops of actors' heads are visible, as are occasional panning movements, but the specificities of the action are obscured. The soundtrack, filled with muffled voices and seemingly diegetic sounds, seems linked to the movie, but upon closer surveillance, its origins are unknown. Meanwhile, an unseen source pours thick black tar onto the branch from offscreen, an action that seems purposeful but pointless.

In many respects, this segment could serve as a summation of O'Neill's multifaceted approach to the optical printer. Taken in its entirety, the shot announces itself as a construction, a cut-and-paste job that recalls graphic design: the branch is emphatically centered, the tar follows a precise, almost mechanical path across the frame, and the tear in the paper/black-and-white movie serves as assertive counterpoint. The entire tableau is very static, almost like a loop, but the mutable drawings and pans in the hidden movie suggest movement, like a diorama with a couple of automated moving parts. The segment is full of metaphors for process that pit the natural against the technological. The act of pouring tar, for instance, is presented with functional regularity, as though it serves some purpose, but little progress seems to be made. The drawings,

of course, directly reference mechanics, devices that can be built and put to use. The segment is also full of allusions to venerable avant-garde filmmaking traditions: the colored confetti to graphic abstraction, the substitution game of the drawings to Structural Film, and the obscured movie to assemblage. In short, the segment amounts to a densely packed technological collage.

The concerns of O'Neill's first 15 years of filmmaking—the graphic qualities of the image, the role of stasis in the context of a time-based art form, and the process-based applications of technology in making art—are writ large in the second phase of his career, in which he shifted to 35mm for a series of extraordinarily accomplished feature-length films. In these films, which include *Water and Power* (1989) and *Decay of Fiction* (2002), the sketch-based experimentation of his earlier work is supplanted with a symphonic form that seeks to unify its disparate elements into a thematically cohesive whole, often with more pronounced political engagement. In both phases of his career, O'Neill has used the optical printer to experiment with form, which is often linked to art historical ideas about design, process, and perspective. This stands in contrast to Barbara Hammer, whose own innovative use of the printer is tied directly to its capacity to provide an emotionally accurate representation of her affective states and personal desires.

Barbara Hammer: The Technology of Touch

If ever there were a meta-film about optical printing, materiality, and the avant-garde filmmaker, it is Barbara Hammer's *Endangered* (1988). An urgent warning about the precarious position of experimental filmmakers, light, and life on planet Earth, this fragile film begins with an off-kilter double exposure of Hammer working steadily on her optical printer while snowflakes, depicted as particles of light energy, swirl around her silhouette. In a series of

traveling mattes, boxes-within-boxes expand and contract, dividing abstract patterns of light into discontinuous fragments. Glimpsed through colored filters, we see Hammer seated at her printer followed by parsed images of endangered species, especially birds and tigers, which are broken apart and rearranged by the restlessly swelling mattes. The meta-shots of Hammer figure her as both producer and protector of the film, her hand steady on the throttle as the natural world breaks into pieces around her. Visible evidence of painting, scratching and sewing emphasize the materiality of the filmstrip, reminding us that celluloid is as imperiled as anything else. In its tactile engagement with the physical world, use of technical effects that serve as metaphors for emotional propositions, and advocacy for the marginalized, *Endangered* features almost all of the major components of Hammer's use of the optical printer.

For those unfamiliar with the scope of Hammer's prolific career, *Endangered* may seem a surprising film for her to make. Even within avant-garde circles, Hammer is best known for her pioneering work as a queer filmmaker—in diaristic films that portray aspects of lesbian sexuality and identity, such as *Dyketactics* (1974), *Superdyke* (1975) and *Women I Love* (1976), and experimental documentaries on LGBTQ history, such as *Nitrate Kisses* (1992), *Tender Fictions* (1996), and *History Lessons* (2000). Understandably, these films have received the bulk of critical attention, although perhaps at the expense of her work from the 1980s, which substitutes some of the radical content of her early films for more radical form.¹¹¹ This is not to downplay Hammer's trailblazing contributions to feminist filmmaking, but to underscore the form/content dichotomy in her work that has frequently rendered her a marginalized figure. As Hammer points out, her early lesbian audiences were often aggravated by the formal challenges of her work, while the candid depiction of lesbian lifestyles seemed outside the purview of the male dominated cinematic avant-garde. In an interview, Hammer recalled, "I could be rejected by both

audiences for different reasons: for content by the avant-garde audience and for form by the lesbian, feminist audience.”¹¹²

Hammer’s earliest films, sincere and playful depictions of same-sex erotic bonding, travels with lovers and friends, and politically engaged lesbian collectives, contain a fair amount of formal innovation. As Ara Osterweil observes, Hammer’s early work is analogous to that of Stan Brakhage, in the sense that she draws upon personal experience as raw material for a reshaping of vision, but with as much attention paid to political and social Otherness as individual consciousness.¹¹³ Relatively early in her career, Hammer was exploring the possibilities of the optical printer, especially as a vehicle for conveying an emotional orientation towards her material. In *Double Strength* (1978), a forthright portrait of the filmmaker’s affair with dancer and performance artist Terry Sendgraff, isolated printing effects serve as metaphors for the emotional stages of the relationship, moving from exhilaration to devastation, and, eventually, reconciliation. Sendgraff invented Motivity, an improvisational form of aerial dance performed on a low-flying trapeze, and Hammer uses freeze frames to analyze her muscular, fluid body as she practices in the nude. Their breakup is represented by a still image of Sendgraff’s face, which is pushed offscreen in increments, a black frame gradually standing in for her absence. Later in the film, Hammer superimposes a still image of herself grieving with a tire running vertically down the length of her body, using the printer to suggest that losing love can engender physical pain, comparable to being run over by a tire.

In other early films, Hammer turned to the optical printer for analysis, using slow motion, freeze frames, and multiple exposures to arrest or multiply her images. In many cases, the printer serves a revelatory function, locating an emotional truth through intense scrutiny, often of the female body. *Multiple Orgasm* (1976) consists of two layers of imagery superimposed so that

neither layer dominates. The first is a tight close-up of Hammer's vulva as she masturbates to orgasm, while the second is comprised of handheld panoramic views of porous rock formations. Surprising visual congruities between the vagina and the rocks begin to emerge, blurring the layers until it seems almost as if the gliding camera is going to slip inside her body. As she climaxes, Hammer freezes the image of her face; rephotographing the images through a purple filter represents the post-orgasm endorphin rush, as if to synaesthetize the afterglow. According to Hammer, "When I made *Multiple Orgasm*, I wanted to see what I looked like [having an orgasm]... That's one of the most intense things in our life, and we've never seen it. I wanted to see what my face looked like. In contraction, it looked like a child being born. I was so surprised."¹¹⁴ In this instance, the use of the optical printer is motivated by a desire to dissect the sexual experience, as an effort for Hammer to understand the mechanics of her own body through self-scrutiny and visual analogy. As in *Double Strength*, Hammer also uses the printer to devise potent visual metaphors for her affective responses.

Considering that Hammer began her artistic career as a painter, she felt an immediate affinity for the printer as a tool for controlling the color and composition of the frame. In 1980, Hammer began to work on *Sync Touch* (1981), a film that was to serve as a kind of manifesto in its formal advocacy for a cinema of touch, and realized that the film necessitated more elaborate printing processes. She was given access to a JK printer through David Heintz, a filmmaker who was teaching at Mills College in Oakland. Mills was home to the Center for Contemporary Music, an internationally renowned program for experimental composition that also maintained a variety of electronic equipment, including a Moog synthesizer and other cutting edge technologies. According to Hammer, Mills also had a JK "in a little cabin tucked away at the back of the grounds of this beautiful private school. They had all kinds of other technical stuff,

but they also had this printer, and no one was in this space. David taught me how to use it and gave me a set of keys to the cabin. I would take my handpainted film there and rephotograph it.”¹¹⁵

Sync Touch is a theoretical justification for the role of touch in Hammer’s cinema enacted on the optical printer. Hammer’s first sexual experience with a woman had a profound effect on her, especially in the sense that touching a body similar to her own gave her a heightened awareness of the power of touch in shaping phenomenological experience. According to Hammer, she became “more sensitized to different areas of my body: trunk, stomach, pelvis, chest and throat. Feelings and emotions became the crucial center of my life, and it was this new source of content I wanted to express in my work.”¹¹⁶ This led her to incorporate hundreds of images of touching into her films. In *Dyketactics*, all 110 shots depict acts of touching, while the artfully composed images of Terry Sendgraff’s muscular and agile body on the trapeze in *Double Strength* demonstrate a palpable physicality.

Throughout the 1970s, Hammer’s ideas about touch and sensation were rooted primarily in intuition and experience, but by the end of the decade, exposure to more theoretical explanations through books by Ashley Montagu and classes on feminist phenomenology at San Francisco State prompted her to develop a more intellectually sophisticated approach to the subject: “The theory is that we touch before we see and so we know the world first through touch rather than sight. A child will know a mother’s breast before their eyes can actually focus. For two months, the world is a blur, but we are touching.”¹¹⁷ By this point in her career, Hammer was friendly with Stan Brakhage. In 1975, she had made a portrait film, *Jane Brakhage*, that sought to investigate Jane’s role in her husband’s filmmaking, forming a kind of triptych with Hollis Frampton’s famous interview of the Brakhages in *Artforum* and Brakhage’s own *Hymn to Her*

(1974).¹¹⁸ In advancing the claim that touch is more primary than sight, Hammer was offering a revisionist, gendered rebuttal of one of the avant-garde cinema's most deeply held precepts, articulated in Brakhage's "Metaphors on Vision": that sight, especially as conflated with "vision," predates language and, therefore, the task of cinema should be to recover a more pure, more adventurous way of seeing.¹¹⁹

The revelation that touch precedes sight and therefore has a constitutive role in shaping perception encouraged Hammer to explore the relationships between touch, sight, and movement in her films. Brakhage's arsenal of defamiliarizing techniques were attempts to locate a visionary aesthetic for film; similarly, Hammer would turn to the optical printer in search of a tactile aesthetic. In the same way that Brakhage's *Anticipation of the Night* (1958) both announces and illustrates the ideas that he would put forth in "Metaphors on Vision," *Sync Touch* serves as an artistic declaration of this theoretical principle. Given that optical printing was central to its making, the film crystallizes one of Hammer's major objectives in working with the device: To foster a tactile, sensual engagement with her materials.

Sync Touch begins with a slow tilt down a wall of filmstrips, an abstract jigsaw puzzle of frames and sprocket holes. The first section of the film is relatively free of optical printing, mostly developing the relationships between touch, sight, and cinema through pixilation, an animation technique that was common in Hammer's films of the period. Black-and-white images of Hammer with her camera, sometimes curled up in bed, where she holds it like a lover, are energetically colored and painted, emphasizing the tactility of handmade working processes. At the film's midpoint, an unidentified woman, rendered entirely in fragmented extreme close-ups of her mouth and face, delivers a lecture that serves as the most straightforward articulation of Hammer's theory of touch in any of her films:

Underlying vision is the fact that feeling by touching precedes sight, phylogenetically and ontogenetically, in every human baby. We all touch first, learn to see later, and in learning establish a nearby visual world on a tactile base, giving a double quality to all perceptions of objects, first within immediate reach and later within ultimate or potential reach. All children, and many adults, want to handle a new sight.¹²⁰

Upon establishing the film's theoretical premise, Hammer turns to the optical printer, both to justify the abundance of female bodies in her earlier films and explore the interconnections between touch and sight. Still and moving images of two women having sex are rephotographed in smaller boxes against a black background, which roll vertically as if to suggest that the viewer is looking at a filmstrip. The women's cavorting bodies are cut out and collaged in front of abstract blobs of color. An extreme close-up of fingers massaging a clitoris is rephotographed as it is pulled vertically through the gate, creating a blur that effectively negates any voyeuristic impulse. The film ends with a close-up of Hammer and another woman in profile, joined arm-in-arm. The woman tries to teach Hammer to pronounce a humorous monologue in French about which language can best be used to convey emotions and feelings, which reinforces the film's central idea.

All of the techniques used in *Sync Touch*, whether achieved with an optical printer or some other means, assert the tactility of the cinematic medium. Hammer's strategy at nearly every turn is to emphasize the film's materiality, whether through painting, scratching, or printing. In the printed section, sexual intercourse is revealed to be the primary tactile experience, and the freeze frames, blurriness, and other defamiliarization techniques offer a corrective to critics who would view Hammer's earlier films as glorified lesbian pornography. Although the film abounds in images of touching, the general principle extends to the film's production, as well. Hammer found working with the optical printer to be an extremely sensual experience. In making *Sync Touch*, she explains: "I rarely let the device run on its own, so I was touching every frame on the

printer. My connection was intimate. I would have my eye touching the eyepiece, my hand on the button, adjusting constantly what the f-stop was going to be. When I'm looking at the frame in the printer, I'm having the feeling in my body, the sensation that this is what I'm going for."¹²¹

The use of the optical printer to explore the phenomenology of touch in cinema, especially conceived as an implicit reconfiguration of Brakhagean aesthetics, soon began to take the form of kinesthetic landscape studies. In films such as *Arequipa* (1981), *Pools* (1981), *Stone Circles* (1983) and *Bent Time* (1983), the printer becomes a vehicle for integrating Hammer's physicality into the phenomenological experience of place. As Claudia Gorbman has argued, Hammer's films from the early 1980s strive to uncover the ways in which a corporeal female body exists in relation to the phenomenal world.¹²² In *Pond and Waterfall* (1982), a subjectivized, first-person camera represents the point-of-view of an unseen swimmer as she moves through an underwater vernal pool. The embodied camera floats past gorgeous, slowly undulating plants and algae, burning fiery orange against the cool blue of the water. The footage has been step printed to increase the sensation of gliding. The camera hovers at the surface of the water, catching delicate patterns of light as they illuminate the ripples. Later in the film, the camera emerges, but it remains perched at eye level with the waterline bisecting the frame horizontally, as if the swimmer is peeking out of the water. Step printed images of a waterfall veer into abstraction as splashing bubbles collide with the camera, showering the swimmer's face.

In *Pond and Waterfall*, the sensual, experiential quality of swimming through water (the film was shot at Point Reyes National Seashore in Marin County) exists in tension with the distinctive, mechanized rhythm of the step printing, which produces an uncannily hypnotic effect, something close to automated meditation. The fact that the image has been transformed through rephotography could also be understood as another gentle rebuke to Brakhage. In

Brakhage's cinema, the camera is often understood to be an extension of his body, with the artist's gestural movement serving to transform his surroundings through a reorientation of consciousness or vision. While Hammer adopts the first-person camera so strongly associated with Brakhage, she subverts the insistence that the viewer adopt his unmediated encounter with the world by introducing a layer of mechanical distance, suggesting that in some cases, mediation actually brings us closer to the rhythms of lived experience.

Hammer's decision to remove the explicit depiction of sexualized bodies from her films was also partly strategic. By the early 1980s, feminist criticism had caught up to Hammer's pioneering work, which some critics felt was too Romantic in its outlook, borrowing idioms from the traditions that it purported to critique.¹²³ In addition, Hammer was eager to challenge herself to make different kinds of films, especially since she had been pigeonholed by the New York establishment as a "West Coast lesbian filmmaker." For all of these reasons, Hammer packed up and moved to New York in 1983, increasing her presence in the galleries and closed circuit of avant-garde screening venues to see if it would inform her practice.¹²⁴ After *Sync Touch*, Hammer had grown tired of the inevitable disruption that resulted from using printers that were not her own, finding that packing and unpacking all of her rolls of film on a daily basis interfered with the flow of the creative process. Consequently, she purchased her own used JK optical printer directly from Jaakko Kurhi, which came with her to New York.

The portability of the JK printer, which could be dismantled and carried in a backpack onto an airplane, proved to be a boon when Hammer was hired to teach film production at Columbia College in Chicago in 1985. Hammer had recently undergone the emotionally overwhelming experience of putting her 97-year-old grandmother, Anna, into a nursing home. Hammer packed up the rolls of black-and-white Super-8 that she had shot of her grandmother in the institution,

along with her printer, and set out for Chicago. In her youth, Anna had been a cook for D.W. Griffith, so Hammer found herself taken by the irony of setting up her optical printer on her new kitchen table and processing her emotional response to such a traumatic event in a medium to which her grandmother had a connection.¹²⁵

The resultant film, *Optic Nerve* (1985), became Hammer's most elaborately printed film up to that point, reintroducing an aesthetic strategy that would become central to her use of the technology throughout the next decade: to make her images more expressive by introducing formal manipulations that are appropriate to, and often emotionally or logically determined by, the content. In contrast to pursuing effects for their purely visual qualities or potential for demonstrating technical virtuosity, Hammer revived her earlier strategy of using technique to develop complex visual metaphors for emotional propositions or feeling states. In *Optic Nerve*, the effects serve the dual function of replicating Anna's perceptual experience, presenting the world to the viewer through her eyes, and representing Hammer's feelings about her grandmother's plight through visual metaphor.

The density of the visual effects in *Optic Nerve* makes it difficult to describe. The film has a fuguelike structure, developing a small set of visual motifs that interweave throughout its duration in increasingly complex variations. In the opening section, Hammer establishes the idea that the film will optically align the viewer with her grandmother's damaged sense of sight. We see a succession of nearly abstract black-and-white images on a Super-8 filmstrip as it is pulled vertically through the gate. It becomes clear that the frames depict Anna's face, cut off at the mouth, with each consecutive frame revealing more of her features. Almost immediately, Hammer begins to alternate rapidly between images of Anna's face, her eye, and a composite of a hospital window with a bucket on a chain hanging in front of it. Each image is onscreen for

only a frame or two, often rephotographed through a red or green filter, and sometimes held as a freeze frame, a disorienting legion of effects that mimics the flattened sense of depth, diminished color vision, and involuntary eye movement that results from damage to the optic nerve.

Almost immediately, Hammer introduces the visual motif that will predominate the film: A point-of-view shot of her grandmother as she is pushed in a wheelchair through the labyrinthine institutional corridors of the hospital. Although the original footage is in black-and-white, splotches of saturated red, green, and pink are smeared across the image, which rolls vertically, making it seem as though the filmstrip is having difficulty maintaining proper registration. In the next set of images, color footage of Anna in a domestic setting, perhaps in earlier days, is submitted to a technically complex series of effects: bisected by a splice mark with rolling images moving in opposite directions on either side, jittery misregistration that recalls involuntary pupillary reflex, superimposition and rack focus, sprocket holes restlessly traversing the surface of the image, and red-and-green strobing that becomes so intense that the colors bleed together to give the viewer the impression of yellow. The electronic score, composed by sound artist Helen Thorington, beeps and thuds with pulsing, mechanical precision.

In the next section of the film, the perception of flatness is further accentuated through rephotography of successive generations of footage, which transform Anna's descent into the hospital into a degraded nightmare of inaccessibility. Hammer's use of rephotography invokes a grainy Impressionism, recalling smudged photos that hover on the brink of legibility, allowing the viewer furtive, sepia-toned glimpses of the ill, elderly faces that line the periphery of Anna's journey. In a subtle parallel, Anna's passage through the hospital corridor is mirrored by footage of another journey, in which she is pushed in her wheelchair through a supermarket. This trip is printed in negative with mottled orange-and-blue patterns of light superimposed over it, almost

as though the image was shot through a fish tank.

As this description suggests, all of this footage is optically transformed by a virtual catalogue of optical printing and editing techniques, which are deployed one after another in short, rapid bursts. Alternation of black-and-white frames generates heavy flicker, positive and negative images are bipped, shots of both similar and divergent content are superimposed, decayed through multiple generations of rephotography, step printed for rhythmic variety, and shot through veils of oscillating colored filters. All of these techniques are used in combination, often for only a few frames at a time. The film pushes toward its climax with a final, long pass through the unending corridor, the screen pulsing with such visual intensity that it provokes a physiological response in the viewer, the images reverberating across the retina.

At first glance, this barrage of optical effects may seem haphazardly deployed, but, in fact, *Optic Nerve* stands as one of the most complicated instances of content influencing form in Hammer's filmography. Explaining the structure of her films, Hammer writes:

My films are not formalist; that is, they do not strictly adhere to an a priori rule of form, but instead spring from my intuitive gut experiences and so are phenomenological. The form is directly determined by the content... My films begin in what I call feeling images, an inseparable unity of emotion and thought/idea/image and internal bodily states of excitement.¹²⁶

For Hammer, an emotional core in the subject matter of a film dictates formal choices—the thread connecting the artistic decision-making process may appear obscure, but only because it is dictated by an emotional logic, not an intellectual one. Hammer also connects emotion with phenomenological response and “internal bodily states of excitement,” which aptly describes the heightened physiological state experienced by viewers of *Optic Nerve*.

As discussed, Hammer's films from the 1970s tend to link emotional content with formal techniques to extend fairly basic visual metaphors. *Optic Nerve* marks a more complex return to

this strategy on the optical printer, most notably by densely layering visual effects to replicate Anna's perceptual experience. As she grew older, Anna suffered from damage to her optic nerve, or cranial nerve II, which transmits visual information from the retina to the brain. Although she was unable to communicate the extent of her impairment, Anna was blind in one eye, which can cause a loss of depth perception, diminished color vision, double vision, blurriness, and irregular saccadic movement.¹²⁷ Therefore, the juxtaposition of positive and negative imagery, strobing, superimposition, color filters, grainy rephotography, stuttering rhythms, misaligned framelines, and flattened depth perspective forces the viewer into an embodied identification with Anna, to see the world through her eyes, both perceptually and emotionally.

In addition, the printing techniques serve as metaphors for Hammer's own emotional experience, conveying to the viewer how she feels about saying goodbye to her grandmother. Pushing Anna through the corridors of the hospital, which Hammer has described as "very traumatic," is printed again and again, the increasing fuzziness of the degraded image paralleling the gradual numbing of Hammer's senses.¹²⁸ The superimposition of Anna's old life with her new one represents taking stock of a lifetime of memories, not so much on the part of Anna herself, but of her granddaughter, who seems to be poring over the images on the printer, enlarging some details while diminishing others. The intense flicker makes it seem as though t¹²⁹he frame is growing, with colors shooting in every direction, which for Hammer serves as a metaphor for her grandmother's death: "It's to say that we don't need to be confined... *Optic Nerve* is also about my grandmother as an angel—as a metaphor—for her spirit leaving the space." In this way, *Optic Nerve* oscillates between representing Anna's first-person experience and Hammer's feelings about that experience.

Following *Optic Nerve*, Hammer continued to apply the same strategy to emotionally

driven material, exploring her sense of displacement or feelings about a powerful new relationship through increasingly complicated technical effects, most notably the use of traveling mattes. Made during a period of dislocation while teaching at Evergreen State College in Olympia, *Place Mattes* combines the approach of letting content dictate form with Hammer's theory of touch by exploring loneliness and isolation through a newfound mastery of traveling mattes. Close-ups of Hammer's hands and feet, interlocking as they caress the frame, are printed in combination with vacation footage from a trip to Cancún, Mexico. The hands sometimes seem to grope the vacation shots as they unspool in the background, but at other times, the beach and ocean are visible through them, as if the images are being projected through a transparent body. In *Still Point* (1991), Hammer's idyllic honeymoon in Maui with her partner, Florrie Burke, is contrasted with shots of the homeless on New York streets by combining four Super-8 images in a single 16mm frame, creating four separate interacting boxes. Although Hammer had found the love of her life, she felt conflicted about the detachment from the world that frequently accompanies the infatuation stage of a relationship. Although the couple was very happy, Hammer wanted to address "the fact that we couldn't live in an isolated ghetto anymore. I needed to bring us out of the comfort of white, middle class life and into the world."¹³⁰ As in *Optic Nerve* and *Endangered*, the printing effects in *Place Mattes* and *Still Point* are conceived in relation to the material, as visual correlates for emotional states.

Lurking in the background of all of these analyses is an artistic goal that spans Hammer's entire career as a filmmaker: to revitalize or recontextualize found or original material in an effort to highlight that which has been overlooked, neglected, or forgotten. Hammer calls this strategy of defamiliarizing images and placing them in new contexts, "making the invisible visible."¹³¹ In Hammer's case, this idea has been most thoroughly explored in relation to issues

of gender and sexuality. As such, the optical printer has played a crucial role as a tool for reworking her material. In *Women I Love* and *Double Strength*, superimpositions and freeze frames both parse and celebrate the female body with intimate frankness, insisting upon its athletic, sexual, and kinesthetic beauty with a rigor that amounts to an act of defiance to patriarchal culture. In *Multiple Orgasm*, Hammer uses the printer to document her own orgasm, honing in on vaginal and facial contractions in an effort to show what we literally cannot see. Later in her career, in films such as *Optic Nerve*, *Endangered*, and *Vital Signs* (1991), Hammer uses more extreme defamiliarization techniques to explore aging, illness, and disease, insisting upon the value of analyzing experiences that are usually unexpressed. In *Endangered*, Hammer imagines herself (and, by extension, her printer) as a figure not unlike Lillian Gish in *Intolerance*, presiding over a world that is breaking into pieces around her.

The connections between recontextualization, the optical printer, and illness are perhaps most evident in *Sanctus* (1990), a found footage film rephotographed from moving image X-Rays shot by Dr. James Sibley Watson in the 1950s that Hammer stumbled across on a tour of the George Eastman House film archive. (As has been discussed, Watson was also an avant-garde filmmaker, building one of the first homemade optical printers for *Lot in Sodom*.) The black-and-white X-Rays quite literally depict that which is normally invisible, presenting remarkably uncanny images of skeletons pouring liquids down their throats or checking their “makeup” in a pocket mirror. More disturbingly, the images also allude to impending death, or at least bodies in trouble, in that each “take” signals exposure to radiation, which Hammer found documented in the notes accompanying the X-Rays. Hammer was instantly moved to rework the material into a film about “a body in need of protection on a polluted planet where immune system disorders and cancer proliferate.”¹³²

In order to highlight the tension between physical beauty and its irradiation, Hammer rephotographed the images on her optical printer through a variety of color filters. The rapidly alternating flashes of color make the footage more expressive, infusing the cold, documentary-like aura of medical imagery with a more personal, emotional tonality. In addition to heightened expressivity, Ara Osterweil illuminates the political implications of aestheticizing this material:

By applying a range of her signature de-familiarizing techniques to the footage, Hammer transforms the visible record of disease into a beautiful, but ultimately resistant document of a body in need of protection from external assault. Thanks to Hammer's interventions, which obscure the anatomical "truth" that the X-ray footage attempts to reveal, the woman's body can resist yielding its corporeal secrets to the male gaze that has been authorized to interpret them.¹³³

Osterweil's analysis persuasively illuminates the relationship between Hammer's formal choices, which are often intuitive and dictated by the emotional content of her material, and their conceptual ramifications, especially as they pertain to bringing a feminist sensibility to material that originated under patriarchal auspices.

The importance of the optical printer to Hammer's artistic practice could not be stated in clearer terms than by the artist herself when she writes:

The JK printer was my machine of choice from the mid-80s to 90s. There were only two hundred printers in existence when I bought mine in 1983. It went everywhere with me: San Francisco, Chicago, apartment to apartment in New York City; I even took it to France. It encouraged creative intimacy with its DIY come-on. I could scratch, paint, burn, filter and superimpose frames. I worked intuitively and kept journals of detailed technical notes. I would have an idea, make it happen, and follow whatever idea came next. This process was extremely satisfying and exemplified my creative process. I loved this printer.¹³⁴

In this passage, Hammer clearly affirms the physical, almost sensual, relationship that she had with her printer, in addition to noting that the technical procedures involved in optical printing corresponded to her own sense of the artistic process. In using the printer to develop a theory of touch in cinema, introducing expressive manipulation to allow a film's emotional content to

dictate its form, and recontextualizing found material to give voice to the marginalized, Hammer belongs to the small group of filmmakers who have adapted the optical printer to their own distinctive ends. In addition, Hammer's use of the printer reveals her body of work to be broader and more expansive than is often assumed.

Conclusion

In Chapter Two, I argued that film labs were sites of negotiation where avant-garde filmmakers learned to navigate a system to which they were considered incidental. By contrast, optical printing represents an instance of the avant-garde co-opting technology to subvert its established uses. Although there were some connections with the industry, primarily through West Coast filmmakers, low-budget optical printing in the form of the JK optical printer emerged directly from the avant-garde, and the films that resulted pursued visual strategies that were markedly different from those in Hollywood. The printer's capacity for sophisticated visual effects reconfigured the avant-garde's investment in perceptual transformation by shifting many image modification processes from shooting to post-production reworking. Many of the printer's inherent constraints, especially its single frame logic and painstaking, solitary working process were reimagined as markers of physical proximity, DIY ethos, and artisanal methods for producing moving images.

Also like film labs, low-budget optical printing connected the avant-garde to adjacent 16mm modes, especially advanced amateur film production, through the cottage industry of specialty publications geared toward technologically inclined readers in the affluent postwar economy. Later, the optical printer was institutionalized in media centers and universities, where it became part of the filmmaking curriculum, contributing to an avant-garde visual vocabulary.

Both the analytic and defamiliarizing modes of its usage are evident in films by Pat O'Neill and Barbara Hammer, who made the optical printer central to their practices. O'Neill pursued a combinatory aesthetic, inducing perceptual transformation through the incongruous juxtaposition of nature and technology. Hammer, on the other hand, linked the optical printer to theories of touch and sensation, the affective dimensions of personal experience, and advocacy for the marginalized.

The ability of avant-garde filmmakers to execute complex visual effects has only strengthened with the advent of digital technology. In fact, the basic vocabulary of avant-garde optical printing has become a standard feature of nonlinear editing systems, which allow for highly sophisticated effects with just a few mouse clicks. Shots can be slowed down or sped up simply by typing a number or copying, pasting, and deleting frames. In Adobe After Effects, video makers and animators can composite their own images with features such as rotoscoping, motion tracking, and foreground/background integration. But this is only one facet of digital production technology that has relevance for the avant-garde. Faced with overwhelming technological change, the avant-garde proved incredibly resilient. In the next chapter, I examine the variety of methods innovated by filmmakers to incorporate digital into their surprisingly durable formal traditions.

¹ P. Adams Sitney, “Saugus Series,” *Millennium Film Journal* 16–17–18 (Fall 1986/Winter 1987): 158.

² For an excellent technical primer on DIY optical printing, see Kathryn Ramey, *Experimental Filmmaking: Break the Machine* (Burlington, MA: Focal Press, 2015), 69–112, 233–282.

³ A selected list of important recent publications would include David E. James, *The Most Typical Avant-Garde: History and Geography of Minor Cinemas in Los Angeles* (Berkeley, Los Angeles, and London: University of California Press, 2005); Scott MacDonald, ed., *Canyon Cinema: The Life and Times of an Independent Film Distributor* (Berkeley, Los Angeles, and London: University of California Press, 2008); Scott MacDonald, ed., *Binghamton Babylon: Voices from the Cinema Department 1967–1977* (Albany: SUNY Press, 2015); Michael Zryd, “The Academy and the Avant-Garde: A Relationship of Dependence and Resistance,” *Cinema Journal* 45.2 (2006): 17–42; Erika Balsom, *Exhibiting Cinema in Contemporary Art* (Amsterdam: Amsterdam University Press, 2013); Steve Anker, Kathy Geritz, and Steve Seid, eds., *Radical Light: Alternative Film and Video in the San Francisco Bay Area, 1945–2000* (Berkeley, Los Angeles, and London: University of California Press, 2010); and David E. James and Adam Hyman, eds., *Alternative Projections: Experimental Film in Los Angeles, 1945–1980* (New Barnet, Hertfordshire: John Libbey Publishing, 2015). See also fn25 of the “Introduction” to this dissertation.

⁴ See Julie A. Turnock, *Plastic Reality: Special Effects, Technology, and the Emergence of 1970s Blockbuster Aesthetics* (New York: Columbia University Press, 2015); and Gregory Zinman, “The Right Stuff? Handmade Special Effects in Commercial and Industrial Film,” in *Special Effects: New Histories, Theories, Contexts*, eds. Dan North, Bob Rehak, and Michael Duffy (London: BFI, 2015), 224–240.

Turnock’s chapter, “A More Plastic Reality: The Design and Conception of *Star Wars* and West Coast Experimental Filmmaking” in *Plastic Reality* (146–78) is the most extensive treatment of optical printing in the avant-garde, so the differences between our approaches deserves comment. Turnock’s interest is in a particular subset of experimental filmmakers based in southern California and their contributions to blockbuster aesthetics of the 1970s. Turnock notes that CalArts served as a training ground for cutting-edge optical printing techniques, arguing persuasively that artists like Pat O’Neill, John and James Whitney, and Betzy Bromberg taught filmmakers like George Lucas and Steven Spielberg “strategies for organizing and mobilizing the elaborately designed composite mise-en-scène” (152).

While Turnock’s account is definitive, it focuses upon a geographically specific minority of avant-garde filmmakers that, although influential, were not especially representative of avant-garde optical printing on the whole. Furthermore, Turnock’s goal is to explain the influence of the avant-garde on blockbuster filmmaking, not to examine the role of optical printing within the avant-garde itself, which was more varied than the composite mise-en-scène that dominated the West Coast milieu. Finally, I seek to locate avant-garde optical printing within amateur, semiprofessional, and experimental film discourses, where it was framed as a more low-budget, do-it-yourself endeavor.

I borrow the term “advanced amateur” from Charles Tepperman, *Amateur Cinema: The Rise of North American Moviemaking, 1923–1960* (Oakland: University of California Press,

2015), 1–2, to refer to the technologically and aesthetically sophisticated branch of filmmakers who participated in the Amateur Cinema League.

⁵ P. Adams Sitney, *Visionary Film: The American Avant-Garde 1943–2000*, 3rd ed. (Oxford and New York: Oxford University Press, 2002), xii. For the counter-argument that avant-garde cinema exists in dialectical relationship to Hollywood, see David E. James, *The Most Typical Avant-Garde*, 11–19.

⁶ See William C. Wees, *Light Moving in Time: Studies in the Visual Aesthetics of Avant-Garde Film* (Berkeley, Los Angeles, and Oxford: University of California Press, 1992).

⁷ Schneemann quoted in Scott MacDonald, “Interview with Carolee Schneemann,” *A Critical Cinema: Interviews with Independent Filmmakers* (Berkeley, Los Angeles, and London: University of California Press, 1988), 145.

⁸ Hammer made this comparison in a telephone conversation with the author, July 7, 2014. Kobland’s remarks from an e-mail conversation with the author, August 20, 2014. O’Neill discusses combinatory artistic practice, including car building and optical printing, in David E. James, “An Interview with Pat O’Neill,” *Millennium Film Journal* 30–31 (Fall 1997): 121. Reed’s description of Brakhage is from Mary Beth Reed, “Mary Beth’s Lecture on Her Films,” a set of notes provided to the author.

⁹ Solomon quoted in Scott MacDonald, “Interview with Phil Solomon,” *A Critical Cinema 5: Interviews with Independent Filmmakers* (Berkeley, Los Angeles, and London: University of California Press, 2006), 206.

¹⁰ See, for instance, Herfrod Tynes Cowling, “For Trick Work, Mr. Fred A. Barber Announces the Perfection of a Wonderful New Optical Printer,” *American Cinematographer* 8.12 (March 1928): 7, 22, 24, and Carl Louis Gregory, “An Optical Printer for Trick Work,” *Journal of the Society of Motion Picture Engineers* 12 (April 1928): 419–426. The link between new film stocks and optical printing is made in Barry Salt, *Film Style and Technology: History and Analysis*, 2nd ed. (London: Starword, 1992), 210. George E. Turner makes a similar claim in “The Evolution of Special Visual Effects,” in *The ASC Treasury of Visual Effects* (Los Angeles: ASC Holding Company, 1983), 48–49.

¹¹ In 1934, Dunn wrote the most detailed and widely circulated article on optical printing within the industry. See Linwood Dunn, “Optical Printing and Technique,” *American Cinematographer* 14.12 (March 1934): 444–446, 470–471. This article was reprinted in the *Journal of the Society of Motion Picture Engineers* 26 (January 1936): 54–66. Another Dunn article from this period is “Tricks by Optical Printing,” *American Cinematographer* 15.1 (April 1934): 487, 496. Turnock discusses Dunn’s influence on the 1970s generation in *Plastic Reality*, 95–98.

¹² “The New Acme-Dunn Optical Printer,” *American Cinematographer* 25.1 (January 1944): 11, 29; “Historic Facts About the Acme-Dunn Optical Printer,” *American Cinematographer* 62.5 (May 1981): 479. Dunn won an honorary Academy Award for the printer in 1980.

¹³ Vern Palen, "A Newly Designed Optical Printer," *The Journal of the Society of Motion Picture Engineers* 67 (February 1958): 98–102. Interestingly, Julie Turnock notes that studios turned away from optical printing in favor of process photography around the time that the Acme-Dunn debuted. See Turnock, *Plastic Reality*, 37.

¹⁴ "Developers of Optical Printer Win Oscar for Special Effects," *New York Times*, April 3, 1981: D5.

¹⁵ L. Bruce Holman, "Build an Optical Printer," *Filmmakers Newsletter* 8.8 (June 1975): 44.

¹⁶ Leonard Hacker, "*Lot in Sodom*," *Film Art* 1.3 (1934): 23.

¹⁷ Ibid. See also Lisa Cartwright, "U.S. Modernism and the Emergence of 'The Right Wing of Film Art': The Films of James Sibley Watson, Jr. and Melville Webber," in *Lovers of Cinema: The First American Film Avant-Garde, 1919–1945*, ed. Jan-Christopher Horak (Madison: University of Wisconsin Press, 1995), 156–179. Filmmaker Barbara Hammer also documented Watson's optical printer in her video, *Watson's X-Rays* (1991). The device itself is on display at George Eastman House in Rochester, New York.

¹⁸ Richard Brick, "John Whitney Interview," *Film Culture* 53–54–55 (Spring 1972): 39–40. All of the information about the Whitneys' optical printers is culled from this interview.

¹⁹ William Moritz, "Harry Smith, Mythologist," in *Harry Smith: The Avant-Garde in the American Vernacular*, eds. Andrew Perchuk and Rani Singh (Los Angeles: Getty Research Institute, 2010), 65.

²⁰ The most detailed description of Hirsh's work in film is Dennis Reed, "Hy Hirsh: Experiments in Filmmaking and Photography," in *Hy Hirsh/Color Photography*, ed. Paul Hertzmann (San Francisco: Paul Hertzmann, Inc., 2008, <http://www.hertzmann.net/pages/catalogs/79.pdf/>).

²¹ Tepperman, 142–48. See also Patricia Zimmermann, *Reel Families: A Social History of Amateur Film* (Bloomington and Indianapolis: Indiana University Press, 1995), 112–21.

²² Tepperman, *Amateur Cinema*, 99.

²³ Ibid., 125.

²⁴ Tullio Pellegrini, advertisement for variable shutter unit, *Movie Makers* 28. 1 (January 1953): 4.

²⁵ Clifford V. Harrington, "Low Budget Optical Printer," *American Cinematographer* 40.5 (May 1959): 300, 302, 304.

²⁶ Ibid., 300.

²⁷ Pelligrini, advertisement: 4.

²⁸ Most articles from early issues of *Filmmakers Newsletter* could be cited for their relevance to avant-garde film practice. A representative sample would include Ubu Films, "Handmade Film Manifesto," *Filmmakers Newsletter* 1.8 (June 1968): 12; Jonas Mekas, "Filmmakers' Cooperative Directors' Meeting, June 24th 1968," *Filmmakers Newsletter* 1.9–10 (Summer 1968): 6; Will Hindle, "Hindle Films," *Filmmakers Newsletter* 1.9–10 (Summer 1968): 1–3; Gary Smith, "Millennium Film Workshop Inc.," *Filmmakers Newsletter* 2.4 (February 1969): 20, and Stan Brakhage, "In Defense of the 'Amateur' Filmmaker," *Filmmakers Newsletter* 4.9–10 (Summer 1971): 20–25.

²⁹ See, for instance, Larry Sturhahn, "Experimental Filmmaking: The FilmArt of Jordan Belson," *Filmmakers Newsletter* 8.7 (May 1975): 22–26; Gloria Allen, "Avantgarde Super-8 in Venezuela," *Filmmakers Newsletter* 9.7 (May 1976): 50–51; Ron Epple, "Festivals: Ann Arbor 77," *Filmmakers Newsletter* 10.8 (May 1977): 57–64; and P. Gregory Springer, "Festivals: Bellevue," *Filmmakers Newsletter* 10.12 (October 1977): 60–65.

³⁰ See, for example, Betty Jeffries Demby and Larry Sturhahn, "Michelangelo Antonioni Discusses 'The Passenger,'" *Filmmakers Newsletter* 8.9 (July 1975): 22–26; Steven T. Smith, "CBS Covers the Conventions," *Filmmakers Newsletter* 9.9 (July 1976): 26–29; and Walter S. Clayton III, "Filming Skydiving: 'Jump'!" *Filmmakers Newsletter* 10.7 (May 1977): 20–23.

³¹ "Filmmaker's Notebook: A & B Roll Editing," *Filmmakers Newsletter* 2.6 (April 1969): 19; "Filmmaker's Notebook: Making Workprints," *Filmmakers Newsletter* 2.7 (May 1969): 22; and John Darren, "Filmmaker's Notebook: Sample \$\$\$ Proposal," *Filmmakers Newsletter* 2.11 (September 1969): 30.

³² See L. Bruce Holman, "Trim Bins and Other Things," *Filmmakers Newsletter* 3.4 (February 1970): 16; L. Bruce Holman, "A Bit About Benches," *Filmmakers Newsletter* 3.6 (April 1970): 24–25; L. Bruce Holman, "Design & Build Your Own Camera Case," *Filmmakers Newsletter* 3.9–10 (Summer 1970): 20; L. Bruce Holman, "Build an Animation Stand—Part 1," *Filmmakers Newsletter* 5.2 (December 1971): 39; L. Bruce Holman, "Build a Microphone Boom," *Filmmakers Newsletter* 5.9–10 (Summer 1972): 42–43; and L. Bruce Holman, "Rear Projection Screen," *Filmmakers Newsletter* 6. 1 (November 1972): 34.

³³ L. Bruce Holman, "Build an Optical Printer," *Filmmakers Newsletter* 8.8 (June 1975): 44. Holman has another connection to the avant-garde. In the 1970s, he was employed by the Film Department at SUNY Binghamton to manage the equipment. Scott MacDonald includes Holman's recollections of his experiences working with Larry Gottheim, Ken Jacobs, Ralph Hocking, and other avant-garde filmmakers in MacDonald, *Binghamton Babylon*.

³⁴ See Lenny Lipton, *Independent Filmmaking* (San Francisco: Straight Arrow Books, 1972); and Lenny Lipton, *The Super 8 Book* (San Francisco: Straight Arrow Books, 1975).

³⁵ Lipton has documented his many accomplishments on his Web site, <http://www.lennylipton.com/>.

³⁶ Charles I. Levine, "Toward an Institute of Advanced Cinema," *Filmmakers Newsletter* 1.3 (January 1968): 1.

³⁷ Gary Smith, "Millennium Exists," *Filmmakers Newsletter* 1.5 (March 1968): 11.

³⁸ *Ibid.*: 11–12.

³⁹ The Pittsburgh and Chicago Coops are discussed in "Film-Makers' Cooperatives," *Filmmakers Newsletter* 2.4 (February 1969): 7–9.

⁴⁰ An exchange between Paul Sharits and Carl Lindner about the difficulties and rewards of teaching avant-garde filmmaking to students can be found in Sharits and Lindner, "Letters," *Filmmakers Newsletter* 1.6 (April 1968): 17–19.

⁴¹ Letter from Larry Jordan to Stan Brakhage, 4/19/72, James Stanley Brakhage Collection, Bx 20, Fd 10, Special Collections and Archives, University of Colorado Boulder Archives.

⁴² L. Bruce Holman, "How To... Convert Regular Rewinds to Long-Shaft," *Filmmakers Newsletter* 3.2 (December 1969): 12.

⁴³ For a detailed history of the *Cinemanews*, see MacDonald, "Introduction," in *Canyon Cinema*, 1–36.

⁴⁴ Lenny Lipton, "Canyon Cinema Research and Development: Optical Printing Stand," *Canyon Cinemanews* (July 1967), unpaginated.

⁴⁵ *Ibid.*

⁴⁶ Film preservationist Mark Toscano has photographed and described this contact printer online at Mark Toscano, "Runaway," *Preservation Insanity* (blog), August 11, 2014, <http://preservationinsanity.blogspot.com/2014/08/runaway.html/>.

⁴⁷ *Screening Room with Robert Gardner: Standish Lawder*, DVD, produced by WCVB-TV and Studio 7 Arts (1973; Watertown, MA: Documentary Educational Resources, 2008).

⁴⁸ *Ibid.*

⁴⁹ Note that one need not subscribe to P. Adams Sitney's controversial definition of Structural Film to recognize the ubiquity of the techniques that came to be associated with it. See Sitney, "Structural Film," *Film Culture* 47 (Summer 1969): 1–10.

⁵⁰ Baillie discusses some of these techniques in Scott MacDonald, "Interview with Bruce Baillie," *A Critical Cinema 2: Interviews with Independent Filmmakers* (Berkeley and Los Angeles: University of California Press, 1992), 127–131.

⁵¹ Richard Whitehall, "An Interview with Bruce Baillie," *Film Culture* 47 (Summer 1969): 17.

⁵² Harry Kreisler, "Film and the Creation of Mind: Conversation with Ken Jacobs, Film Artist," *Conversations with History*, Institute of International Studies, University of California, Berkeley, October 14, 1999, <http://globetrotter.berkeley.edu/people/Jacobs/jacobs-con0.html/>.

⁵³ *Tom, Tom, the Piper's Son* as an exemplification of Jacobs's pedagogy is discussed in Michael Zryd, "Professor Ken," in *Optic Antics: The Cinema of Ken Jacobs*, eds. Michele Pierson, David E. James, and Paul Arthur (New York: Oxford University Press, 2011), 255–258; and Scott MacDonald, *Binghamton Babylon*, 197–201.

⁵⁴ When it was first invented, the company and printer were stylized as "J-K," although it is now more common to use "JK."

⁵⁵ Larry Jordan, telephone conversation with the author, January 9, 2014.

⁵⁶ Ibid.

⁵⁷ Ibid.

⁵⁸ The Web site for Meritex and JK Camera can be found at <http://www.jkcamera.com/>. Information about Kurhi's background stems from the conversation with Larry Jordan cited above.

⁵⁹ Larry Jordan, telephone conversation with the author, January 9, 2014.

⁶⁰ Jaakko Kurhi, Optical Printer, U.S. Patent 3,846,022, filed March 5, 1973, and issued November 5, 1974.

⁶¹ Jaakko Kurhi, telephone conversation with the author, August 18, 2009.

⁶² Advertisement for J-K Camera Service, *American Cinematographer* 53.4 (April 1972): 454. The same advertisements appear in *Filmmakers Newsletter* throughout this period. The advertisements provide a means for tracking price increases in the JK's early years. For instance, the cost of the printer increased to \$680 in February 1973 and then to \$753 in January 1974.

⁶³ "Developers of Optical Printer Win Oscar": D5.

⁶⁴ Bill Brand, interview with the author, September 30, 2015.

⁶⁵ For information on BB Optics, see Andrew Lampert, ed., *Results You Can't Refuse: Celebrating 30 Years of BB Optics* (New York: Anthology Film Archives, 2006).

⁶⁶ Gary Smith, "Millennium Exists": 12.

⁶⁷ Letter from Howard Guttenplan to Stan Brakhage, 5/30/77, James Stanley Brakhage Collection, Bx 49, Fd 11, Special Collections and Archives, University of Colorado Boulder Archives. The details about Millennium's purchase of the JK are outlined in this letter.

⁶⁸ Ibid.

⁶⁹ The footage is derived from an early arcade game, also called *Wild Gunman*, created by Nintendo in 1974. The arcade game made use of a 16mm projection screen, which accounts for the fact that Baldwin's footage is photographic, in contrast to the 8-bit graphics associated with early home entertainment video game systems.

⁷⁰ The concept of Expanded Cinema, a synaesthetic approach to the media arts intricately bound up in consciousness and technology, was introduced by Gene Youngblood in Youngblood, *Expanded Cinema* (New York: Dutton, 1970).

⁷¹ Many of these effects (along with explanations for executing them technically) are discussed in Bastian Clevé, *The Art of Personal Filmmaking* (Laguna Niguel, CA: Images International, 1989).

⁷² Lawder quoted in *Screening Room with Robert Gardner*.

⁷³ *Intolerance* has existed in different cuts over the years, ranging from 163 to 210 minutes, depending upon the projection speed and the amount of material included. I cannot be certain which version Lawder used, but the most likely candidate seems to be the 16mm Killiam Shows cut, which runs 176 minutes.

⁷⁴ Reed discusses some of these techniques in Reed, "Mary Beth's Lecture on Her Films."

⁷⁵ Noël Carroll, "Choreographic Canvases," *Soho Weekly News* (December 1978).

⁷⁶ Peter Rose, e-mail conversation with the author, December 7, 2014. All of the technical information about the Synchronopticon and the making of *Analogies* stems from this interview.

⁷⁷ This is a modified definition from Sitney's. His first attempt at describing Structural Film is Sitney, "Structural Film," *Film Culture* 47 (Summer 1969): 1–10. His position was later revised in Sitney, *Visionary Film: The American Avant-Garde 1943-2000*, 3rd ed. (Oxford and New York: Oxford University Press, 2002), 347–370.

⁷⁸ For an analysis of Kobland's early work, see Lindley Hanlon, "Collision Course: Ken Kobland's Optical Prints," *Millennium Film Journal* 7–8–9 (Fall 1980/Winter 1981): 253–259.

⁷⁹ Phil Solomon, "The Frame," *Millennium Film Journal* 35–36 (Fall 2000): 123.

⁸⁰ McLaren quoted in Gretchen Weinberg, "Mc et moi," *Film Culture* 25 (Summer 1962): 47.

⁸¹ For more on Kubelka's frame-based theory of cinema, see Peter Kubelka, "The Theory of Metrical Film," in *The Avant-Garde Film: A Reader of Theory and Criticism*, ed. P. Adams

Sitney (New York: Anthology Film Archives, 1978), 139–159; and Jonas Mekas, “An Interview with Peter Kubelka,” *Film Culture* 44 (Spring 1967): 42–47.

⁸² See Gregory Markopoulos, “Towards a New Narrative Film Form,” *Film Culture* 31 (Winter 1963–64): 11–12.

⁸³ Peter Rose, e-mail conversation with the author, December 7, 2014. Su Friedrich, e-mail conversation with the author, October 11, 2009.

⁸⁴ Julie Murray quoted in Mike Hoolboom, “Long Live Experimental Everything: An Interview with Julie Murray,” *Millennium Film Journal* 50 (Fall 2008): 24.

⁸⁵ Barbara Hammer, telephone conversation with the author, July 7, 2014.

⁸⁶ In replicating the text, I have followed Friedrich's request to preserve her preferred spacing and line breaks, which approximate the rhythm with which the text appears onscreen. The script of *Gently Down the Stream* is available online at http://sufriedrich.com/PDFs/PDFs%20of%20English%20scripts/Gently_Down_the_Stream.pdf/.

⁸⁷ The number of dreams is sometimes cited as fourteen, but when I compare Friedrich's script with the finished film, I count a total of twelve.

⁸⁸ Bruce Jenkins, “*Gently Down the Stream*,” *Millennium Film Journal* 16–17–18 (Fall 1986/Winter 1987): 196.

⁸⁹ All of the information about the production of *Gently Down the Stream* is from Su Friedrich, e-mail conversation with the author, November 9, 2009. Friedrich provides more background in Scott MacDonald, “Interview with Su Friedrich,” *A Critical Cinema 2: Interviews with Independent Filmmakers* (Berkeley, Los Angeles, and Oxford: University of California Press, 1992), 290–293.

⁹⁰ Although this dissertation's subject is the American avant-garde cinema, I include Arnold (as well as fellow Austrian Peter Kubelka) in the discussion because his work was widely seen and highly influential in the States—in the small world of avant-garde cinema, international permeability is something of a given. Arnold has also taught at many American institutions, including the University of Wisconsin-Milwaukee, the San Francisco Art Institute, Bard College, and SUNY Binghamton.

⁹¹ These two films form a loose trilogy with *Alone. Life Wastes Andy Hardy* (1998), which was made with a very early non-linear editing system.

⁹² For instance, see Maureen Turim, “Eine Begegnung mit dem Bild” (“An Encounter with the Image”) in *Avantgardefilm: Österreich. 1950 bis Heute (Austrian Avant-Garde Film: 1950 to the Present)*, eds. Alexander Horwath, Lisl Ponger, and Gottfried Schlemmer (Vienna: Wespennest, 1995), 301–307; and Akira Mizuta Lippit, “Cinemnesia: Martin Arnold's Memory Apparatus,”

in *Ex-Cinema: From a Theory of Experimental Film and Video* (Berkeley, Los Angeles and London: University of California Press, 2014), 56–72.

⁹³ Arnold quoted in Scott MacDonald, “Interview with Martin Arnold,” *A Critical Cinema 3: Interviews with Independent Filmmakers* (Berkeley, Los Angeles, and London: University of California Press, 1998), 350.

⁹⁴ *Ibid.*, 361.

⁹⁵ Instead of naming the frames $x+1$, $x+2$, etc., I simplify by labeling them with their actual frame number—23 is the 23rd frame of the film, for instance.

⁹⁶ Arnold quoted in MacDonald, “Interview with Martin Arnold,” 351.

⁹⁷ Paul Arthur, “Permanent Transit: The Films of Pat O’Neill,” in *Pat O’Neill: Views from Lookout Mountain*, ed. Julie Lazar (Santa Monica and Göttingen, Germany: Santa Monica Museum of Art and Steidl Verlag, 2004), 69.

⁹⁸ Julie Turnock discusses O’Neill’s involvement in the production of *Return of the Jedi* (1983) in *Plastic Reality*, 159–160.

⁹⁹ Admittedly, I am leaving out “minor” films such as *The Last of the Persimmons* (1972) and *Sleeping Dogs (Never Lie)* (1978), as well as loop projections such as *Let’s Make a Sandwich* (1978), and *Two Sweeps* (1979). While these films exhibit some of the same concerns, they were made with different objectives than the “mainline” composite films, so I’ve put them to the side.

¹⁰⁰ O’Neill quoted in David E. James, “An Interview with Pat O’Neill”: 127.

¹⁰¹ Sitney, “*Saugus Series*”: 158.

¹⁰² See, for instance, Christine Noll Brinckmann and Grahame Weinbren, “The O’Neill Landscape: Four Scenes from *Foregrounds*,” *Millennium Film Journal* 4–5 (Summer/Fall 1979): 101–116; Grahame Weinbren and Christine Noll Brinckmann, “Selective Transparencies: Pat O’Neill’s Recent Films,” *Millennium Film Journal* 6 (Spring 1980): 51–72; and Grahame Weinbren, “Coloured Paper in Monument Valley: Contradictions, Resonances and Pluralities in the Art of Pat O’Neill,” *Moving Image Review & Art Journal* 1.2 (September 2012): 155–166.

¹⁰³ See Paul Arthur, “The Western Edge: Oil of LA and the Machined Image,” in *A Line of Sight: American Avant-Garde Film Since 1965* (Minneapolis: University of Minnesota Press, 2005), 92–110; Scott MacDonald, *The Garden in the Machine: A Field Guide to Independent Films About Place* (Berkeley, Los Angeles, and London: University of California Press, 2001), 208–221; and David E. James, *The Most Typical Avant-Garde*, 428–440.

¹⁰⁴ Most of these details are culled from this interview. See John G. Hanhardt, “A Conversation with Pat O’Neill,” in *Pat O’Neill: Views from Lookout Mountain*, 194–98.

¹⁰⁵ O'Neill quoted in James, "An Interview with Pat O'Neill": 121.

¹⁰⁶ O'Neill quoted in Hanhardt, "A Conversation with Pat O'Neill," 200.

¹⁰⁷ O'Neill quoted in James, "An Interview with Pat O'Neill": 125.

¹⁰⁸ O'Neill quoted in Hanhardt, "A Conversation with Pat O'Neill," 196.

¹⁰⁹ Turnock, *Plastic Reality*, 130.

¹¹⁰ The assemblage strain of the avant-garde, especially its relationship with Pop Art, is surveyed in James Peterson, *Dreams of Chaos, Visions of Order* (Detroit: Wayne State University Press, 1994), 126–177.

¹¹¹ Chuck Kleinhans provides an overview of Hammer's career in Kleinhans, "Barbara Hammer: Lyrics and History," in *Women's Experimental Cinema: Critical Frameworks*, ed. Robin Blaetz (Durham and London: Duke University Press, 2007), 167–187. The most substantial feminist consideration of Hammer's work is Jacquelyn Zita, "The Films of Barbara Hammer: Counter-Currencies of a Lesbian Iconography," *Jump Cut* 24–25 (March 1981): 26–30. Ara Osterweil productively nuances the "lesbian filmmaker" tag by exploring three of Hammer's films about aging and illness in Osterweil, "A Body Is Not a Metaphor: Barbara Hammer's X-Ray Vision," *Journal of Lesbian Studies* 14.2–3 (2010): 185–200.

¹¹² Kate Haug, "An Interview with Barbara Hammer," *Wide Angle* 20.1 (January 1998): 87.

¹¹³ Osterweil: 187–188.

¹¹⁴ Hammer quoted in Haug: 91.

¹¹⁵ Barbara Hammer, telephone conversation with the author, July 7, 2014. All of the information about Hammer's access to optical printers and specific techniques is derived from this interview, unless stated otherwise.

¹¹⁶ Barbara Hammer, "Lesbian Filmmaking: Self-Birthing," in Hammer, *Hammer! Making Movies Out of Sex and Life* (New York: The Feminist Press at the City University of New York, 2010), 101.

¹¹⁷ Hammer, telephone conversation with the author, July 7, 2014. Hammer also discusses her theory of touch in Haug: 68–70.

¹¹⁸ Hollis Frampton, "Stan and Jane Brakhage, Talking," *Artforum* 11.5 (January 1973): 72–79.

¹¹⁹ See Stan Brakhage, *Metaphors on Vision* (New York: Film Culture, 1963), unpaginated.

¹²⁰ This passage is derived from Theodora Kroeber, *Alfred Kroeber: A Personal Configuration* (Berkeley, Los Angeles and London: University of California Press, 1970), 267.

¹²¹ Barbara Hammer, telephone conversation with the author, July 7, 2014.

¹²² Claudia Gorbman, "Barbara Hammer's Recent Work: Body Displaced, Body Discovered," *Jump Cut* 32 (April 1987): 12–14.

¹²³ Although these attitudes rarely made it to print, perhaps the most stinging criticism is Andrea Weiss, "*Women I Love, Double Strength: Lesbian Cinema and Romantic Love*," *Jump Cut* 24–25 (March 1981): 30.

¹²⁴ Hammer candidly discusses her ambitions in moving to New York in *Hammer!*, 108–111.

¹²⁵ *Ibid.* See also *Hammer!*, 110, 144.

¹²⁶ Hammer, "Use of Time in Women's Cinema," *Heresies: A Feminist Publication on Art and Politics 3: Lesbian Art and Artists* (1977): 86. Reprinted in *Hammer!*, 85.

¹²⁷ See Haug, "An Interview with Barbara Hammer": 72–73.

¹²⁸ *Ibid.*: 73.

¹²⁹ *Ibid.*: 81.

¹³⁰ Barbara Hammer, telephone conversation with the author, July 7, 2014.

¹³¹ *Ibid.*

¹³² Hammer, *Hammer!*, 208.

¹³³ Osterweil, "A Body Is Not a Metaphor": 196.

¹³⁴ Hammer, *Hammer!*, 207.

Chapter Four The Task of the Translator: Digital Cinema

In 2011, scholars Malcolm Turvey and Federico Windhausen hosted a roundtable on digital avant-garde filmmaking that included filmmakers Flo and Ken Jacobs, Luis Recoder, Lynne Sachs, and Mark Street. The occasion testified to the fact that digital had transformed the avant-garde, offering a set of constraints and possibilities that were both alarming and exciting. The many disagreements among the filmmakers also testified to the contradictions at the heart of the new medium. Street notes that he appreciates the financial and technological restrictions of shooting a roll of film, which limits the amount of material he can accrue, but Ken Jacobs confesses that he enjoys “having too much stuff on video, and then looking through it and seeing what unexpected thing I find.”¹ Recoder and Sachs suggest that digital has paradoxically spawned a revival of “the old analogue hands-on process,” but Street fears that this represents a commodified and clichéd faux-nostalgia.² Jacobs subverts expectation by expressing his love for miniature digital cameras that “focus by themselves,” “get the right light levels by themselves,” and take pictures at the touch of a button.³ Street, Sachs, and Jacobs lament the fact that non-linear editing encourages younger filmmakers to engage with a computer screen instead of the physical world, but Jacobs then muddies the binary by explaining that he pores through his digital footage “the way you might look at the world with a film camera.”⁴ Sachs observes that editing decisions in film were relatively difficult to undo, while digital entails working with footage that can be endlessly revised “so that if you don’t like what you do today you can always go back to what you did yesterday,” but the filmmakers cannot decide if this is a positive or negative development.⁵ Although the panel participants cannot come to a consensus on digital,

their disagreements indicate the pervasiveness with which digital technologies have subsumed the production, distribution, and exhibition of avant-garde cinema.

Although analogue video had existed for decades, there remained a permeable but unmistakable division between 16mm avant-garde filmmaking and video art. In some respects, these institutional and aesthetic entrenchments persevered because analogue video did not threaten film's existence; Eastman Kodak still produced film stock, the bigger labs stayed in business, and an infrastructure for the technology continued to survive. Digital video, on the other hand, promised—and largely succeeded—to decimate film, proffered by market forces as a replacement rather than an alternative. Of course, this posed significant challenges to the avant-garde's sense of identity. The standard account of avant-garde cinema is that of a filmmaking mode that, in the words of Whitney curator John G. Hanhardt, “subverts cinematic convention by exploring its medium and its properties and materials.”⁶ As previous chapters have demonstrated, the avant-garde has systematically investigated (and upended) nearly every facet of the cinematic medium. What happens when the medium disappears?

In many respects, the answer is a story of continuity rather than overhaul. In this chapter, I account for some of the methods pursued by avant-garde filmmakers to assimilate digital production technologies into enduring formal paradigms. Like Federico Windhausen, I argue that this development is a testament to the elasticity and durability of the cinematic avant-garde, not an inherently conservative retrenchment or vindication of tradition.⁷ That said, digital has qualitatively changed both filmmakers' working processes and much of the basic toolkit for pursuing revelatory visual experiences. In some cases, filmmakers adapted their abiding formal and conceptual concerns for the new medium, using digital technology to broaden the poetic, Structural/Materialist, and collage modes. In other cases, filmmakers changed course, taking

their practice in entirely new directions. Moreover, an analysis of the discourse surrounding digital provides a detailed record of the complex negotiation of technology that has always galvanized the avant-garde filmmaking community.

The avant-garde's acceptance of digital suggests a number of important questions, most of which have only begun to be addressed. How did the avant-garde reconfigure the inherent constraints of digital production technologies into aesthetic possibilities and reconcile them with avant-garde filmmaking paradigms? How did filmmakers extend the concerns of their previous film-based work into the digital realm? Did digital technology encourage the development of new genres of avant-garde cinema? How does a mode of filmmaking predicated upon materiality and the haptic, organic qualities of a medium adjust to a technology noted for its sterility and coldness? Now that many of the functions of optical printing and lab work have been incorporated into non-linear editing software, what are the ramifications for post-production reworking of the image? In keeping with earlier chapters on film labs and optical printing, how does digital reveal the avant-garde's imbrication within and dependence upon other filmmaking modes, and what are the ways in which avant-garde filmmakers negotiate professional, semi-professional, and prosumer affiliations and identities?

Because digital is so encompassing—and because it does not represent a single technology but many constantly evolving technologies—it is impossible to address all of its consequences. This chapter particularly emphasizes the methods used by a generation of analogue filmmakers to incorporate digital into their existing practice. In deliberate symmetry with Chapter One, this entails revisiting filmmakers discussed earlier in the dissertation, including Peggy Ahwesh, Phil Solomon, and David Gatten, all of whom have made significant contributions in digital video. Surprisingly, the digital era has coincided with a reinvigoration of

avant-garde filmmaking, programming, and criticism, as the “minor cinema” generation of the 1980s and 1990s became “old masters” to a crop of younger filmmakers fully conversant with digital practices. Many of these filmmakers are active in the art world and on the Internet, making digital practices essential conceptual components of their videos—consider Paper Rad, Cory Arcangel, Ryan Trecartin, and Paul Chan, for instance. While their work is impressive and valuable, I have focused upon filmmakers who transitioned from film to video to maintain continuity with previous chapters. Of course, digital has also revolutionized distribution and exhibition, providing new contexts for the presentation of experimental moving images. Although this is a significant development, I keep to the parameters of this dissertation by limiting my analysis to digital production technologies.

Despite dramatic technological change, the avant-garde has remained committed to visual transformation through the post-production reworking of the image. Although the principle endures, the techniques have changed. As I will argue, digital’s major constraints—a bias for hyperreal deep focus and non-materiality—have encouraged filmmakers to pursue alternative methods. In the absence of emulsion decay, chemical treatments, lab experiments, or optical printing, how can artists remake their images? In *Lossless #3* (2008), a glitch video by Rebecca Baron and Douglas Goodwin, keyframes are removed from a digital version of *The Searchers* (1956), leaving a smeared set of blocky artifacts akin to painting with pixels. For *Light Is Waiting* (2007), Michael Robinson essentially made digital superimpositions, placing two layers of the same image track directly on top of one another in Final Cut Pro, flopping the top layer to create a mirroring effect, and then adjusting the “composite mode” of the layers, which affects the opacity of each image. In an effect that would be unthinkable without digital editing software, Scott Stark’s *The Realist* (2013) is a dazzling display of rapid alternation between

slightly offset stereoscopic photographs that energetically overhauls our sense of motion. While these filmmakers are resolutely digital in their methods, they submit their images to retroactive manipulation that shares clear affinities with films discussed in preceding chapters.⁸

In Chapter Two, I argued that avant-garde filmmakers learned to negotiate a technological infrastructure that existed to service other 16mm-based filmmaking modes. Similarly, the shift to digital was promoted by the Hollywood studios, and it flowed both top-down and bottom-up, affecting every sector of moving image production from cell phone videos to tentpole summer blockbusters. For perhaps the first time in its history, the avant-garde had access to the gamut of filmmaking technologies. Moreover, Lev Manovich has argued that “avant-garde aesthetic strategies came to be embedded in the commands and interface metaphors of computer software,” noting that collage (i.e. cut and paste), painting on film, composite imagery, and frames-within-frames are basic components of most off-the-shelf software.⁹ Although one could argue with Manovich’s link between these functions and the filmic avant-garde, his point stands in the sense that experimental filmmakers have an unprecedented degree of access to mainstream technologies that allow for the kinds of formal innovation that they, in many respects, pioneered.

This chapter examines the contributions of digital technology to the visual aesthetics of avant-garde cinema. In the first section, I use posts made to FrameWorks, an online discussion group devoted to avant-garde filmmaking, to trace shifting attitudes to digital through the standard and high-definition eras, highlighting the two most imposing constraints of digital video: its bias for crisp realism and its immateriality. The following sections function as case studies in the strategies used by filmmakers to engage directly with these constraints. First, I consider Leighton Pierce’s use of digital cameras and non-linear editing software to pursue a

painterly aesthetic, extending the poetic tradition into the digital realm through extremely slow shutter speeds and image layering. Next, I turn to the video game film, a new avant-garde subgenre, to explore Peggy Ahwesh and Phil Solomon's excavations of the sensual qualities and ideological overtones of found digital images. Finally, David Gatten's *The Extravagant Shadows* (2012) provides an example of a filmmaker firmly associated with 16mm using digital technology to expand upon and reinterpret his presiding formal and conceptual concerns.

Digital Comes to the Avant-Garde

In some respects, the avant-garde's gradual embrace of digital filmmaking is a simple story of initial skepticism, intense debate, and eventual acceptance. In contending with digital, however, filmmakers and critics addressed nearly every major facet of the avant-garde's characteristic approach to technology: visual transformation, the organicism of film, amateurism vs. professionalism, post-production reworking of the image, and, of course, medium specificity. In previous chapters, I have argued that avant-garde filmmaking objectives were partly formulated in relation to technological constraints. This is also the case with digital, with one major caveat: Because the technology developed so quickly, propelled by the professional, prosumer, and amateur markets and migrating through a dizzying number of formats within the span of a few years, digital's constraints were in a constant state of negotiation, subject to vigorous debate within the avant-garde that far exceeded that of the other technologies addressed in this dissertation. In this section, I provide a discursive analysis of the avant-garde's assimilation of digital technology, focusing on two particular problems—image quality and materiality—to establish a framework for the avant-garde's incorporation of new technology into its established traditions.

Of course, video was not a new subject of debate for the avant-garde. In the 1960s, Andy Warhol and Nam June Paik experimented with the freshly minted Norelco and Sony PortaPak video recorders, establishing “video art” as its own tradition with an aesthetic, theoretical, and institutional infrastructure that existed alongside the 16mm-based avant-garde.¹⁰ Video’s degraded image quality encouraged recording-based applications, and in Rosalind Krauss’s seminal article, “Video: The Aesthetics of Narcissism,” self-encapsulation and performance were posited as video art’s central aesthetic and conceptual preoccupations, with the art world its institutional province.¹¹ A generation of gallery-based artists, including Vito Acconci, Bruce Nauman, Richard Serra and Nancy Holt, Joan Jonas, Peter Campus, Martha Rosler, Bill Viola, and Steina and Woody Vasulka, worked in video, while the 16mm avant-garde continued to distribute its films through the cooperatives and screen at its own venues, such as the Pacific Film Archive, Anthology Film Archives, and Millennium Film Workshop. While some artists moved between these worlds, they were able to exist independently because one did not threaten the existence of the other; as long as film stock remained on the market and enough labs stayed in business to process it, the avant-garde and video art could remain separate.

With the advent of digital, however, the infrastructure for 16mm began to erode, making video impossible to ignore. Scholars such as Stephen Prince and David Bordwell have provided robust institutional histories of cinema’s digital conversion that identify early milestones in the production sector. In the 1960s and 1970s, experimentation with computer graphics at Bell Labs and MIT laid the groundwork for their integration into moving pictures at Lucasfilm and Pixar, where C.G.I. provided impressive visual effects for blockbusters such as *Terminator 2: Judgment Day* (1991), *Jurassic Park* (1993), *Forrest Gump* (1994), and *Toy Story* (1995).¹² Meanwhile, Avid Technology transformed the post-production process through the introduction

of sound mixing and non-linear editing software, namely Pro Tools and Media Composer, rapidly adopted by the studios between 1993 and 1996. Digital image capture came later, with low-budget standard definition experiments such as *The Blair Witch Project* (1999) and *The Anniversary Party* (2001) setting the stage for George Lucas's venture into high definition for his *Star Wars* prequels (2002–05).¹³ By the late 2000s, digital auteurs such as Michael Mann and David Fincher were assisted by a steady stream of high-definition cameras, each more impressive than the last—the Sony CineAlta, Panavision Genesis, Thomson Viper, RED ONE, and Arri Alexa.¹⁴ As with the other technologies discussed in this dissertation, however, these developments affected the avant-garde only tangentially. While Andrew Johnston has examined the imbrication of the avant-garde with early computer animation, most avant-garde filmmakers in the 1990s did not have access to technology like RenderMan or Media Composer.¹⁵ Instead, their introduction to digital was through the consumer market with “amateur” (soon re-branded as “prosumer”) technologies such as camcorders, MiniDV, and Final Cut Pro.

Because the avant-garde depended upon the prosumer market, its adoption of digital production technologies was understandably delayed. By 1996, Avid's Media Composer dominated Hollywood editing, but it was not until the diffusion of computer-based editing programs such as Adobe Premiere (priced at \$795 in 1996), Final Cut Pro (\$999 in 2000), and Media 100 Cinestream (\$500 in 2001) that non-linear editing became available to the avant-garde.¹⁶ While George Lucas was commissioning Sony to build the customized HDW-F900 for his *Star Wars* prequels, avant-garde filmmakers were mostly limited to prosumer camcorders. At the high end was Digital Betacam (DigiBeta) (1993) or, later, Betacam SX (1996), which recorded standard definition video onto a cassette and was popular with news organizations.¹⁷ More common were the Sony camcorders, the DCR-VX1000 (1995), DCR-TRV900 (1998), and

DCR-VX2000 (2000), which recorded and played back on mini-DV, a smaller tape, and retailed for \$2700–3500 in the early 2000s.¹⁸ With the resources at his disposal, Lucas pushed Sony for enhanced image quality, a filmic texture, and easy integration of computer-based effects. At the prosumer level, however, the buzzwords were miniaturization and cost reduction. Consequently, SD camcorders had smaller image sensors that reduced dynamic range and did not perform well without studio lighting. Frustratingly for avant-garde filmmakers, they also tended toward automation of focus, aperture, shutter speed, and color balance. This emphasis on portability, affordability, and ease of use meant that many filmmakers did not consider SD much of an upgrade from analogue video.

Unlike film labs or optical printing, the Internet provided a forum for avant-garde filmmakers to debate digital's advantages and disadvantages as it developed. Much of this discussion took place on FrameWorks, a listserv begun in November 1995 by Pip Chodorov, a French filmmaker and video distributor. Chodorov recognized the need for an online community of avant-garde filmmakers, scholars, critics, curators, and archivists, and FrameWorks swelled from 200 to 600 subscribers between 1996 and 2004.¹⁹ In the mission statement, Chodorov reinforced the split between experimental filmmaking and video art that was *de rigueur* at the time, stipulating that video (as well as narrative and documentary) was not intended to be discussed.²⁰ Chodorov was not personally opposed to video, but he felt that avant-garde cinema needed its own forum free from video-related technical questions, which he thought would be best served by their own specially designated list.²¹ Periodically, posters to FrameWorks would debate this policy, but for the most part, this prohibition was not enforced.²² Because the listserv was created as digital video arrived, the film vs. digital debate became the question that arguably defined its existence. As early as 1998, one subscriber noted the frequency with which the topic

came up, and by 2002, contributors were including statements like “I don’t want to have film vs. video round ten” in their posts.²³

As might be expected, objectors far outweighed supporters in the earliest days of digital. One major problem was the visual characteristics of standard definition video, rooted in inferior resolution and poor exposure latitude. Keith Sanborn pointed out: “When I shoot, I can sure tell the difference between something shot on a medium capable of 11 stops and a resolution which exceeds 5,000 dots ... and on one capable of 5 stops with no toe and shoulder and 720 dots in the horizontal dimension of the frame.”²⁴ The larger issue, however, was the set of interrelated characteristics that led to digital’s predilection for hyper-clarity, deep focus, and uncannily crisp, realistic images that looked almost three dimensional. Video was notorious for having less dynamic range than film, so skies and lighter portions of the frame tended to blow out, resulting in a harsh, synthetic look. As mentioned, early digital camcorders had relatively small CCD chips, which increased depth of field, rendering shallow focus more difficult to achieve. The standardized 29.97 frame rate and interlaced scanning corresponded with a lack of motion blur. In combination, all of these factors made it extremely difficult for digital cameras to capture the veiled, painterly image associated with 16mm, which was especially prized by filmmakers working in the poetic tradition. Lynne Sachs complains that “the shame of the digital world is that as the machinery gets more and more advanced, there is an attempt to mirror reality as closely as possible. That is what I think is so disturbing, whereas the avant-garde is not trying to mirror reality.”²⁵

This position was articulated on FrameWorks in 1996 by Brook Hinton, a media artist who teaches at CalArts: “Then there’s the fact of the entirely different sets of texture, tonality, and motion characteristics. I find both film and video to be wonderful mediums to work in, but

they have as much to do with each other as clay and steel.”²⁶ Hinton blames digital video’s sterile, clinical image on two factors: its continual scanning motion and the differences between reflected and projected light. In fairly typical language, Hinton suggests that projected light (as emanating from a television screen) is narcotizing, dulling the senses to produce a zombie-like effect: “I hate video. I hate television. The ‘soft strobing glow’ produces something in me like a comforting all over headache. A disease which seduces me into repeat contractions.”²⁷ For Hinton, the specific qualities of the video image produce ill health. Like Stan Brakhage’s film *Delicacies of Molten Horror Synapse* (1991), video light is identified with the artificial and toxic, while film is associated with the organic and nurturing.

Although concerns about the phenomenal qualities of projected light subsided with improvements in technology, the dichotomy between the organic and inorganic persisted. In 2016, Nathaniel Dorsky explained: “I find the more humane quality of light and the warmth and body of the physical image of celluloid projection to be essential to how my films communicate. My films speak to the body of the viewer and the digitization of them removes their more weighty physical presence and limits their ability to communicate or function as I have intended.”²⁸ Dorsky elaborates, “I cherish the physicality of 16mm film projection. It is like an acoustic instrument. I love its body and warmth, its vulnerability and intimacy, its tenderness and earthiness.”²⁹ Like film stock, discussed in Chapter One, projected light is imbued with metabolic properties, possessing a humanity that is held in contradistinction to the cold indifference of digital. For many filmmakers, digital’s ontology fundamentally precludes it from possessing the auratic quality of film.

Of course, pixel count, dynamic range, and resolution were of major concern to the industry, as well. For the avant-garde, however, quality was not necessarily about resolution or

the quantitative dimensions of obtaining the “best-looking” image. As we have seen, in most of its interactions with technology, the avant-garde has valued the haptic, accidental, and material. Therefore, many avant-garde filmmakers were most distressed by the loss of film’s sensual, organic character, which was thought to be beautiful precisely for its flaws. For instance, Scott Stark observed:

In film, visual noise—over- or under-exposure, light leaks, bad processing, even dirt and scratches—can be quite beautiful, bridging the fissures between the filmed reality, the process that is recording it, and the physical surface of the film. Such exploration has become an accepted part of cinematic language. In video, however, I’ve not found much noise that is anything other than ugly and intrusive, save for a few late night moments of bliss watching channel snow with the sound turned low and a bag of Chips Ahoy at my side.³⁰

The video equivalent of “visual noise” is the digital artifacting that results from boosting the gain, an electronic amplification of the video signal that artificially brightens the image. Unlike the aberrations cited by Stark, these artifacts are not the result of human error or even physical contact, but the workings of an electronic signal performing an automated function. Therefore, the debate over image “quality” was about the experiential and individualistic characteristics of film, not an objective pixel count.

There were also practical problems with exhibition. As Bordwell and others have noted, the tipping point for digital projection did not occur until 2009–2011, well into the high definition-era.³¹ Playback on mini-DV was considered subpar, and there was no mistaking video projection for film. After attending the Impakt festival in the Netherlands, scholar William Wees compared the film and video projection, noting that the differences between them were extremely apparent. “Both media produce suitable images for projection,” Wees reported, “but they just ain’t the same images, and it is the job of the artist to take advantage of what her/his chosen medium has to offer—and never to assume that it doesn’t really matter.”³² Furthermore,

many film festival venues and microcinemas were not equipped or simply preferred not to exhibit digital formats, so many felt that work originating in video should be finished on film if the filmmaker intended to submit to traditional, non-video specific festivals. Dominic Angerame, the former director of Canyon Cinema, insisted that the cost of transferring video to film undermined claims that digital video's potential lay in its affordability. "If you want your work to be projected in a film theatre...then remember...the key word is film," Angerame wrote. "If not then use the computer, use the video monitor.....and the best place for viewing such imagery is the computer or video monitor."³³

For example, Scott Stark transferred his video *NOEMA* (1998) to 16mm for its premiere at the Walter Reade Theater for the New York Film Festival. In *NOEMA*, Stark re-edited a porn video to emphasize the dead time for the performers between sex acts—consequently, its medium was a fairly important conceptual component. Nonetheless, Stark opted to have the video transferred using a Kinescope process at DuArt, resembling more traditional working methods. Stark noted that there were substantial differences between the video and film versions of *NOEMA*: "Images that were merely informational [on video] are visually enriched. The strobing effect in certain camera movements, which is a by-product of the transfer process, and occasional jagged edges around body parts lend a tenuous quality to the imagery... Though the final product is film, it still clearly references contemporary porn's video origins; the low grade magnetic graininess remains intrinsic, though oddly removed, transformed, even ephemeral. In all it's quite a different piece."³⁴ In this case, the necessity of exhibiting the work demanded a change in format, which resulted in video and film versions that Stark viewed as distinct entities.

Because most filmmakers were not finishing in video, many had only preliminary experience with non-linear editing software. In the early 2000s, Final Cut Pro and Media 100

Cinestream began to be purchased by colleges and universities, where many avant-garde filmmakers held teaching positions. For those finishing in mini-DV, these programs held promise. For those still rooted in 16mm, however, non-linear editing had little use value; shooting in 16mm, using a telecine process to convert to digital, then scanning the final cut back to film did not make aesthetic or financial sense. Consequently, the potential for software to supplant the optical printer through built-in sets of filters that mimicked many of its functions was not initially a topic of much discussion. Perhaps surprisingly, avant-garde filmmakers instead focused upon the ability to revise instantly, which some felt was a hindrance that encouraged careless decision making. Jeff Kreines, the co-director of cult documentaries *Demon Lover Diary* (1980) and *Seventeen* (1983), wrote:

Cutting on an Avid, it's easy to pick an approximate frame for a cut, because you can fix it later. No decision need be made ... which leads to sloppy thinking. (This is probably why they are so popular in the corporate media world.) Cutting on film, you are going to pick that frame very carefully, so you don't have twenty excess splices in your workprint. This is a good thing. Also good is all the thinking time you get while splicing, rewinding, putting stuff into and out of the bin, etc.³⁵

Filmmaker Caspar Stracke agreed, noting that he could speed up and slow down images with more ease than on his JK optical printer, but when it came to editing, he was ambivalent:

There is the guillotine splice cut on film, which is a kind of one-time decision: Like a barber cutting hair, the cut has to be absolutely right, and if not, it can only be corrected by cutting more and more off. It is an approach from one direction only... A digital cut can be approached two directional, it is subdivided into an infinite universe of fractions... On the one hand I claimed to have truly found new depths in film editing and at the same time I had to admit that it weakened my decision making...³⁶

While all filmmakers did not share this view, it suggests a fundamental difference between avant-garde filmmakers and their commercial counterparts. According to market logic, the chief advantage of non-linear editing was its endless revisability, the fact that decisions no longer

needed to be irrevocable. For the avant-garde, however, careful contemplation and the “do-or-die” logic that David Gatten equated to a way of life in Chapter Two, was an essential part of the filmmaking process. For Kreines, Stracke, and others, ease of use—a guiding principle of consumer technology—was paradoxically a handicap.

Despite these problems, digital video had some passionate early defenders. One of the most vocal was Jon Jost, who was known for his experimental narrative features in 16mm and 35mm before switching to digital in 1996. Sony gifted Jost two camcorders, the DCR-VX700 and the DCR-VX1000, and he purchased Adobe Premiere for his desktop computer. He was hooked almost immediately. In a letter to *Release Print*, the newsletter of the San Francisco-based Film Arts Foundation, Jost declared 16mm to be dead and urged the Foundation to convert to full digital production:

The colour is richer, the graphic quality is amenable to much greater control (if you want it grainy, you can have it), you can shoot in places so dark film would never handle it, you get digital stereo sound, and just out are a handful of computer cards that turn a decent PC that costs one or two thousand bucks into a dynamite editor for another one to four thousand bucks—and frees you of labs, studios, sound mixing studios, etc., most of which will bill you the cost of the whole system for two or three days in their facilities. Aesthetically, DV can easily match 16mm, though don't look for it to look like “film”—it isn't. But also don't look for it to look like “video,” at least not in any form you thought of before...³⁷

Jost's letter was reposted to FrameWorks, where it incited a great deal of controversy. One poster described the letter as a “near-drunken conversion,” while another cracked that “DV is Pixelvision Plus.”³⁸ Although many were provoked by Jost's abrasive proselytizing, his advocacy proved to be prescient, anticipating the widespread conversion to digital that would occur with the advent of high definition. Even back in 1989, Jost predicted that the future of independent cinema would be “a combination of video/computer synthesis, done on home-level equipment such as the Super VHS, Beta ED, or video 8 formats interfaced with Amiga [an early

computer-based editing system] or Atari or the new generation Macintosh computers for graphics and music.”³⁹

In addition to its visual qualities, the other major problem with digital technology was its lack of materiality. Most of the techniques, objectives, and working processes discussed in this dissertation were predicated upon the interaction between filmmaker and material, from emulsion decay to multiple roll printing to optical rephotography. Troublingly, digital was solely binary code, stripped of the human element that made film personal. In a manifesto posted to FrameWorks, Scott Stark wrote a personal history of 8mm locating its essence in the middle six feet, when the filmmaker needed to interrupt shooting to flip the roll. Stark noted that the fogging, flaring, and other visual “accidents” that marked this moment were symbolic of the filmmaker’s relationship to his or her material. In a passage worth quoting at length, Stark laments the loss of this connection in digital video:

In the 1980s, as video began replacing film as the home movie medium of choice, movie makers found themselves even further distanced from the technology they were using to create images. Video tape couldn’t be fogged, and mistakes were easily corrected. The images were recorded through some mysterious electronic process that couldn’t be seen or touched. And now, in the year 2000, digital video requires an even more complex and impersonal apparatus, further distancing makers from the physical processes involved in creating and recording images. Sophisticated internal motors reduce camera shakiness. Exposure and focus are instantaneous, automatic and exact. Sound precludes a need for visual cues. Images do not exist without the machines and software required to interpret binary data. Technology, driven by commerce and a thirst for efficiency, endlessly attempts to eradicate any lingering traces of humanity from the craft of cinema. History is rewritten to accommodate the trend of the moment. Any personal vision in contemporary moviemaking must now come solely from its content, not its form.⁴⁰

In a widely lauded sentiment, Stark suggests that technology’s advancement is a process of slowly negating human agency. In a later post, he compares the evolution of film technology to drawing on paper with crayon versus on a computer screen with a mouse. Although the computer

is capable of more “sophisticated” results, its operations necessarily remove the personal connection. “What interests me about technology,” Stark explains, “is not what it can do, but what it can reveal about human-ness or the world or whatever is outside its hermetically-sealed universe.”⁴¹ Although Jost dismissed this as the “hippy dippy breadmaking argument,” many avant-garde filmmakers felt that visual transformation, artisanal working processes, and the exploration of cinema’s haptic qualities constituted the core of avant-garde filmmaking.⁴²

Contributors to *FrameWorks* were not entirely polarized, however. In fact, the most commonly expressed viewpoint was a variant of the Modernist medium-specificity argument that has always been influential among avant-garde filmmakers and critics. For many, film and video both had their merits and drawbacks, but it was a false dichotomy that forced the abandonment of one for the other. Robert Schaller, the chemist who introduced Phil Solomon to the Mordançage process described in Chapter One, acknowledges that “film is a beautiful medium” while “digital imaging ... offers possibilities that couldn’t even be imagined on film.” “Where the debate seems to me to go awry,” Schaller writes, “is in setting these two goods in opposition to one another.”⁴³ Implicit in Schaller’s comments is the familiar idea that film should explore that which makes it film, while digital is best suited for that which makes it digital. This was a belief shared by both film purists and DV converts. Despite his enthusiasm for digital, Jon Jost insisted that filmmakers should never use it in an attempt to imitate film, suggesting that “those trying to make DV ‘look like film’ should try making oils with watercolors and learn something.”⁴⁴ While this was a common sentiment, very few posters provided specific examples of videos that tried to pass as films. The particular techniques that would signal a misguided attempt at mixing technologies seemed to remain ambiguous.

Although there were dozens of holdouts, many of the most accomplished avant-garde filmmakers converted a portion or all of their production to digital formats between 1998 and 2001. In the standard definition era, Ken Jacobs, Jonas Mekas, Ernie Gehr, Fred Worden, Leighton Pierce, Leslie Thornton, Scott Stark, Peggy Ahwesh, and Michael Snow worked with mini-DV to demonstrate some of the most exciting possibilities for the new medium. For instance, Jacobs began to develop a digital equivalent of his complicated Nervous System projection system, Stark used Final Cut Pro for rapid and precise alternation between images, and Gehr pursued a medium-specific inquiry into digital video. Meanwhile, the Digital Cinema Initiatives corporation, consisting of the six major studios, formed to standardize the new medium in March of 2002. As David Bordwell has explained, the DCI group put specifications in place that guided producers, distributors, exhibitors, and software companies through the high-definition era.⁴⁵ The results of their endeavors would not affect the avant-garde for another decade, but their specifications for exhibition, in particular, would eventually trickle down.

In the meantime, the first glimpses of high definition persuaded some avant-garde filmmakers to abandon their earlier reservations. Upon viewing HD transfers of Brakhage's films for the Criterion Collection's *By Brakhage* DVD set, critic Fred Camper, a diehard film purist, admitted that "seeing the HDTV versions on a \$50,000 SONY monitor was a revelation. I realized that a lot of my objections to video were not to the cathode ray tube but just to the effects of the low resolution. With higher resolution, textures are clearer, depth effects even stronger."⁴⁶ Similarly, Jeff Kreines reversed some of his earlier opinions: "I still love film, but I can see virtues to using new (not current) technology to make films... Who suspected you could hand-crank a digital camera?"⁴⁷

As Stephen Prince has noted, 2006–2008 marked a series of aesthetically adventurous HD shoots by Michael Mann, David Fincher, and Steven Soderbergh on cutting edge cameras like the Thomson Viper and RED ONE.⁴⁸ Avant-garde filmmakers, on the other hand, took advantage of improved DSLR technology. DSLRs (digital single-lens reflex cameras) use a reflex-design scheme to capture still images, but the Nikon D90, introduced in 2008, was also capable of recording HD moving images. Within a year, the Canon EOS 5D Mark II and Panasonic Lumix GH1 were introduced to the prosumer market as fully DCI-compliant. These cameras boasted larger image sensors than mini-DV-based camcorders, which significantly improved their performance in low light conditions and allowed for shallower focus and subtler gradations in color and density. The improvements in resolution and larger image sensors in HD SLRs seemed to push digital closer to film than to analogue video. In a departure from the mission statement, it became increasingly common for established filmmakers to post to FrameWorks asking for assistance with HD cameras or Final Cut Pro without instigating a debate about ontology or materiality.⁴⁹

The tipping point for the avant-garde's full acceptance of digital proved to be the dramatic improvements to projection systems that marked the shift to high definition around 2010. Bordwell explains that the establishment of the Digital Cinema Package (DCP) as the standard format for digital presentation also affected film festivals, which have transitioned to almost entirely digital projection.⁵⁰ Since most contemporary avant-garde cinema is screened at film festivals or microcinemas, this has created a two-tiered exhibition system. For top filmmakers, an important aspect of professionalization is to premiere new work at one of the prestigious avant-garde sidebars at major festivals like Rotterdam, Berlin, New York, London, Hong Kong, Toronto, Edinburgh, and Ann Arbor. The ease of creating a DCP, which can be

made from a personal computer or by a third party for a relatively small fee, has made finishing on digital a common option. After its premiere, a film or video by a major artist will typically travel the circuit of avant-garde specific film festivals, such as Media City, Images, Crossroads, Milwaukee Underground, Big Muddy, Black Maria, and Onion City. While many of these festival venues do not have the capacity for DCP as of this writing, all are equipped with projection systems that easily accommodate high-resolution Quicktime files, which can be made directly from any non-linear editing software.

The ability to finish digitally and distribute and exhibit a film or video as a high-resolution file or DCP encouraged hybridity. Commonly, avant-garde filmmakers shoot on 16mm for filmic texture, transfer the footage to digital, cut picture and sound with non-linear editing software, and show the film to audiences on DCP. Filmmaker and writer Gregg Biermann speaks to this hybridized situation, noting that the film vs. digital debate is now a “transitional issue where technologies of the past meet with those of the present. For contemporary artists who make work in a de-materialized ‘mediumless medium’ where work is made to be delivered in video projection or monitor it is a meaningless discussion.”⁵¹ Although film still has its defenders, the debate is less polemical, as filmmakers simply declare their preferences rather than heap condemnation upon other artists. For instance, Pip Chodorov observes: “The film medium inspires me, the textures, colors and punchiness of the image, the smell, feel and weight of the machines... I like working with 8 and 16 and capturing light in that way, as I have done since I was 6 or 7, and I doubt I would continue on another medium. Nothing against the other media ... I just have never felt inspired in that way.”⁵²

Although the conversation is less contentious, the fundamental constraints of digital video—image quality and immateriality—never completely dissipated, as evidenced by the

number of filmmakers still shooting on 16mm and transferring to video for editing and sound mixing. Filmmaker Sam Wells argued that HD, while impressive, would never possess film's organicism, no matter the resolution. In 2002, he wrote:

If you are using video—perhaps of considerably lower ‘definition’ now, and using it expressively, in tune with it’s own formal properties, you may be happy, there is no problem. But at the filmic level ... both as HD can look now and as what it may become, I think it’s very clear that in some kind of default state it’s an image bereft of the [organic, physical processes]. That it has it’s own qualities now is not in doubt, and it’s no surprise to me that George Lucas is one of the first to jump on this: need a high-tech slick and smooth futuristic image, The Movies’ answer to *Myst* and *Raven*, you got it, George.⁵³

Furthermore, filmmakers who were drawn to film for its material dimensions were still unsatisfied with an essentially dematerialized medium. Filmmaker and curator Steve Polta explained:

I happen to like tinkering with machines (cameras, projector, editors, etc) and I like working with my hands. I like looking at the row of still images on a film strip and I like cutting and reassembling pictures (and sounds).... Working with video, editing on a computer, makes me feel like I’m working in a office, and I don’t like that feeling. If that’s filmmaking I think I’d rather do something else with my time.⁵⁴

Despite technological improvements, coldly realistic images and immateriality remained digital’s most determining constraints, equivalent to the linearity of 16mm, variability in film processing, or frame-by-frame operation of the optical printer. Even filmmakers who did not fully subscribe to the medium-specificity thesis pursued new methods for visual transformation and a tactile connection with the technology, and many extended their film-based practices into the digital realm by incorporating these methods into established avant-garde modes. Filmmaker Nicky Hamlyn suggests that a fruitful approach to film vs. digital “is to look at how different media inflect and inform practices, rather like the way water colour works differently to oil, necessitating different working methods, and exhibiting distinct limitations and strengths.”⁵⁵ In

the following case studies, I take Hamlyn's observation to heart, examining the ways in which accomplished avant-garde filmmakers adapted their working practices for digital. In the case of Leighton Pierce, who has always been interested in video, digital provided an opportunity to deepen his commitment to shallow focus, layering, and stream-of-consciousness imagery.

Digital Painting: Leighton Pierce and the Poetic Tradition

Over a nearly forty-year career, Leighton Pierce has used film and video to explore his immediate surroundings, extending the poetic tradition of avant-garde cinema and steadily producing painterly images that transform the mundane into small-scale, absorptive drama. The standard reading of Pierce's cinema is that he provides viewers with a "reprieve from the tendency of modern life" through the defamiliarization of the domestic.⁵⁶ In his homebound epics of the 1990s, such as *Thursday* (1991), *50 Feet of String* (1995), and *Glass* (1998), Pierce investigated the camera lens's ability to transform his backyard, kitchen, and bedroom, experimenting with extremely shallow depth of field, idiosyncratic camera placement, and the careful staging of movement. Above all, Pierce layered sound to evoke a sense of space that seemed simultaneously naturalistic and uncanny. Pierce was always open to the possibilities of video, which has come to dominate his work since *Wood* (2000), his first digital piece. In his recent work, Pierce has developed a uniquely digital working process to achieve a painterly image while reconfiguring the poetic tradition for his new medium.

Earlier in this dissertation, Peter Hutton and Nathaniel Dorsky provided examples of filmmakers whose images were said to be "painterly." In discussing their films, I noted that painterly images in cinema transfigure the natural world while retaining some denotative connection to reality. This involves an affiliation of interrelated characteristics: an emphasis on

texture, surface, and the haptic dimensions of cinema, often resulting in softness, lack of resolution, or graininess; sensitivity to the qualities of light as reflected through domesticity and the rhythms of experience; highly composed images that activate the frame, defamiliarize everyday objects, and initiate perceptual shifts; and gestural camera movement that sometimes aligns with the filmmaker's consciousness or bodily rhythms. Although painterly images can be found in many modes or subgenres of avant-garde cinema, they are strongly associated with the poetic tradition. In Chapter One, I argued that an essential component of Hutton and Dorsky's painterly aesthetics was the particularities of specific film stocks, which lent their films distinctive textures and dramatic color palettes.

By contrast, Leighton Pierce's pursuit of a painterly aesthetic in his domestic films of the 1990s was intimately related to the mechanics of the camera lens, especially in terms of shallow depth of field. Pierce explained to Scott MacDonald his three most common methods for achieving the shallowest possible depth. First, Pierce would shoot with the telephoto end of a zoom lens, typically from 75–150mm. He would then open the iris all the way and cut outdoor light with neutral density filters to avoid overexposure. This would flatten most of the image's depth, allowing for unexpected shifts in figure-ground relationships. Second, Pierce would often shoot through grass or weeds in the immediate foreground to amplify diffraction, the hazy, shimmering effect that results from light bending around the edges of solid objects. Finally, Pierce would exploit the fact that extreme telephoto lenses respond dramatically to shifts in vantage point, so staging events in relation to the camera position became a delicate operation of slight adjustments to elevation, tilt, and angle.⁵⁷ Because most of the frame was out of focus, Pierce could also place objects in the background solely for color or compositional balance. A

blue bench, for instance, would not register denotatively as a bench, only as a hazy field of blue that would offset the object in the foreground.⁵⁸

In a masterful analysis, MacDonald has shown how these techniques operate in Pierce's best known film, *50 Feet of String*, arguing that Pierce's transformation of the domestic space is both a validation of the Zenlike "gardens" hidden in our immediate surroundings and a political act related to Emerson's notion of physical and spiritual self-reliance as manifested in the home.⁵⁹ MacDonald notes the functions of Pierce's manipulation of depth of field with the camera lens: 1) to prompt sudden metamorphoses wherein movements of humans or vehicles into and out of the frame recalibrate the visual field; and 2) to achieve dramatic moments through subtle gradations of focus, which activate dormant portions of the frame in surprising ways. He cites as his examples the segments "two maples," in which sequential views of a boy on a swing consistently thwart the viewer's spatial expectations, and "yard-scape," which features a lengthy rack focus that moves from distant trees through several layers of blurry "curtains" of weeds to a single stalk, and finally settles on a thin stem in the immediate foreground.⁶⁰ Although he does not use the phrase "painterly," MacDonald's analysis clearly demonstrates Pierce's use of Zeiss lenses on a 16mm Bolex to defamiliarize his environment through composition, softness of contour, and the blurring of the image, which renders his films less diaristic and more abstract.

Even in the 1980s and 1990s, Pierce never found much distinction between film and analogue video, which he shot concurrently. Surprisingly, Pierce's videos from this era exhibit many of the same techniques as his films, suggesting that he did not necessarily subscribe to the medium-specificity thesis that many of his colleagues shared. *Principles of Harmonic Motion* (1991) was shot on a Canon Hi8 camcorder with a built-in lens that Pierce modified with consumer telephoto adapters. Despite the inferior lens mechanism, Pierce achieved striking

renditions of effects similar to those described by MacDonald in *50 Feet of String*. For instance, the second section of the video, “No Green at Ease in the Margins,” begins with two out-of-focus shots of swaying grass that appear as full-frame sheets of green and white abstraction. These are followed by a startling sequence of rack focuses in which focus shifts across three planes of branches and leaves, getting progressively closer to the viewer. This shot is repeated 13 times in shorter and shorter iterations, with the relentless rack focuses engendering a kind of roiling surface, almost like a small segment of a Turner painting coming into and going out of focus. Pierce follows this with an extreme telephoto shot of a lace window curtain in pristine focus while a solid mass (presumably a car) unexpectedly activates the space beyond the window.

Because Pierce never held an ideological opposition to video, he was more excited than threatened by the advent of digital. In fact, Pierce felt that many of the assumptions held by video’s detractors—its tendency for crisp realism, deep focus, low dynamic range, replacement of noise for grain, and lack of inherent motion blur—were incorrect. For Pierce, these were not ontological qualities, but tendencies that were amplified by the artist’s decisions: “Crisp realism is a choice, not a characteristic of the medium. Deep focus is a lens choice regardless of medium. Low dynamic range is a misunderstanding of digital video. Motion blur, obviously, has nothing to do with whether something is shot on 16mm, analog, SD, HD, or 4K, for that matter.”⁶¹ Despite his enthusiasm for digital video, however, its initial standard definition iteration presented challenges for Pierce’s work with the camera lens. In smaller, portable SD cameras, the lenses were less versatile than in 16mm. Pierce observed:

With the small camera, you get these lenses with very funky focus mechanisms; no footage markings, no absolute position of the focus ring to any particular distance. In fact, focus position is determined not only by the position of the ring but by the speed with which you turn it; it’s velocity-sensitive the way a mouse on a computer is. That drives me crazy. It also removes the focus shift technique from my palette.⁶²

Consequently, Pierce was forced to abandon some of the techniques that he had developed in the 1990s.

This, however, did not preclude him from pursuing a painterly aesthetic rooted in shallow focus and motion blur. Instead of lens adjustments, Pierce developed a new approach to post-production, where digital offered more control and better opportunities for layering images and creating a sense of seamless flow. In his initial foray into standard definition digital video, Pierce discovered a method of blending the profilmic with post-production to achieve painterly images that did not simply imitate the “veiled” look of 16mm. Pierce’s transition to non-linear digital editing was informed by his background in *Musique concrète*. The software’s basic functionality had a similar logic to sound mixing in that media was linearly organized in multiple tracks that allowed for cutting, fading, minute adjustments to individual elements, and overlap. Pierce began working with 24-track recording in 1986 when he began teaching at the University of Iowa. In 1993, he first used Avid’s Pro Tools, digital audio software that provides graphical representation of sonic information in the same manner as that of contemporary non-linear video editing. Consequently, Pierce was accustomed to conceiving of audio in terms of acoustic flow, interruption, and fluid transformation that made him eager to experiment with the same processes on the image track.

On the surface, *The Back Steps* (2001), the first video in which Pierce pursued these techniques, is deceptively simple. We see an overhead shot of two young girls dressed in princess costumes and seated side-by-side on the back steps of a house at night. A small Persian rug is clearly visible behind them. The camera tilts to follow as they rise from their perch and run down the steps away from the camera, enveloped by the inky darkness. The image, however, has been slowed down dramatically and smeared so that there are no hard lines or edges, and the

girls' costumes bleed across the frame. Their simple movement is looped, so that the girls rise up, then sit down again, but the effect is of delayed motion, movement folded back upon itself. Streaks of light stretch away from the girls' bodies and then return when they sit down, imbuing them with a spectral sheen. The few lights in the house leave dotted trails reminiscent of time lapse photography, and the frame seems to vibrate or pulsate with energy. The soundtrack consists of a faint rustling, combined with occasional giggling from the girls, which contributes to the video's diffuse quality. When the girls reach the darkness beyond the house, it is as though they fade into it, engulfed by the night. As the loop progresses, a white lawn chair skates by them, enhancing the feeling that the images are being painted in time. At the end of the video, the camera movement combined with the loop causes the girls to dissolve into themselves, as they move away from the camera physically, but paradoxically retain their relative position in the frame. The function of these effects is to suffuse the video with the feeling of a half-remembered dream or sense memory, more akin to the recollection of an event than a documentation of the event itself. In its smudged and sensuous delicacy, *The Back Steps* manages to capture a sense of the fleetingness and ephemerality of time. Even simple gestures can never be recovered, arising out of the flow of experience, imprinting themselves in our consciousness, and drifting away.

The Back Steps developed from an image that Pierce took of his daughter and her friend on Halloween night. Because he was shooting a home movie, he set his digital camera to auto-focus. Due to the fact that the video was filmed in near darkness, the camera auto-adjusted the shutter speed to create a longer exposure time. Digital cameras have the capacity for extremely slow shutter speeds, and at 1/4 of a second, for example, images become heavily streaked and acquire pronounced motion blur. When Pierce saw the results, he was attracted to the beauty of

the smeariness and the bleeding of the colors, despite the short length of the shot. In Media 100 CineStream, an early non-linear editing platform, Pierce copy-and-pasted portions of the clip in his timeline, linking them with dissolves. This created a series of progressive loops, a concept that Pierce had explored in audio, but never in video. He also applied a slow-motion effect, which augmented the slow shutter speed and looping to create a dreamlike ambience.

A potential problem, however, is that slow shutter speeds also affect movement. In addition to motion blur, images often exhibit a conspicuous stutter, which lends them a glitchy chunkiness. Moreover, Pierce's loops were more abrupt than fluid, which stood at odds with the hypnagogic abstraction of the imagery. The solution to both of these problems was to copy the images and stack them on top of each other in layers. After pasting a clip into the track above the previous, Pierce would offset them by one to four frames, so that dozens of layers of identical images were visible at once, but slightly out of sync. Pierce developed a rather complex approach to the opacity, as it was necessary to adjust transparency levels so that each layer was more or less equal in brightness. In non-linear editing, the default setting grants priority to the top track, so Pierce discovered that he needed to set the bottom track at 100 percent with each subsequent layer becoming progressively less opaque. As he stacked images in the timeline, he adjusted each layer to be slightly more transparent, tweaking the numbers as he observed the effects on the image in a continuously evolving process. He also recognized that slight variations in opacity allowed him a high degree of control over nearly imperceptible micro-rhythms. For *The Back Steps*, Pierce had almost 24 tracks of images, which took nearly 36 hours to render before he was able to see what he had done. After weeks of trial and error, the result was a swishy, fluid poeticism that produced a blurriness unlike the lens-based manipulations that he had applied in 16mm and analogue video.⁶³

This is not to say that every aspect of Pierce's painterly approach to digital video was entirely new. In some respects, *The Back Steps* represented the continuation of a method that Pierce had pursued in a 16mm film, *Red Shovel* (1992), and temporarily suspended. *Red Shovel* consists of seven still lifes of a child's red plastic shovel filmed, as a title card announces, on High Street in Stonington, Maine on the Fourth of July, 1991. In the first shot, the shovel is in the mid-ground left, resting on a white surface, while a hazy tangle of weeds softly sways behind it, and an indistinct yellow blob hovers somewhere in the distance. With each shot, Pierce slightly adjusts his focal length and relative position to the shovel to force startling perceptual shifts. By the fourth shot, it is revealed that the yellow blob is actually a flower, and the shovel is relegated to only a horizontal red blur. In the fifth shot, the most revelatory transformation occurs, as we realize that cars are passing on a remote background plane, a phenomenon previously available only on the soundtrack. The shot also reveals an American flag in the far distance. If these streaky, smudged compositions were the first shots in the film, it would not be clear that the painterly dash of red in the bottom left was in fact a plastic shovel.

Red Shovel anticipates Pierce's work in digital video in that it uses a combination of profilmic and post-production techniques to dissolve planes of focus, creating a smeared, Impressionist image. As in Pierce's 16mm films, the effect results from the use of a 160mm lens, diffraction, and careful variation in camera position to collapse the sense of depth. However, a host of lab-based interventions were also introduced. In order to lengthen the shots, Pierce had the lab optically print each frame four times. As in the later *The Back Steps*, Pierce discovered that his use of a slower shutter speed imbued his footage with a heavy chunkiness, so he made four separate rolls of the negative, which he ordered the lab to print in multiple passes at 1/4 the exposure with the sync displaced by a single frame. This layering successfully smoothened

movement and surfaces. In Pierce's digital videos, the optical printing and off-sync contact printing have been replaced by using the slow motion effect and layering clips in non-linear editing software, but the idea is essentially the same. In both cases, the result is a lyrical, nearly liquefied image that transforms objects into evocative impressions of sense memory.

Following his renewed interest in layering after *The Back Steps*, Pierce began to apply these techniques to the kinds of subjects that he had explored in the 1990s, especially through the use of a fixed camera position. For *Pink Socks* (2002), shot on the Piazza San Marco in Venice, Pierce places his digital camera on the ground, as a roundelay of pigeons and pink-socked feet come into and out of the frame across three planes of focus. As the video progresses, the slow shutter speed and off-set layering effects become more pronounced, resulting in a horizontal swirl of feet and pigeons. A rhythmic, nearly Tatiesque orchestration of movement quietly transitions into a chaotic whirl of pure texture. *Water Seeking Its Level* (2002) consists of fragmented close-ups of bare feet in an aqueduct, as the soundtrack evokes a conversation between Pierce and his daughter. The shutter speed is extremely slow, rendering the autumnal hues and light moving across water as intensely shimmering near-abstraction. Although the subject matter is similar to his 1990s films, especially in its emphasis on Pierce's children in natural environments, the painterly texture is less rooted in subtle shifts between planes of focus than their total dissolution.

Pierce's transition to digital video initiated another change in his filmmaking: a newfound emphasis on gestural camera moves. In his 16mm work, Pierce almost always relied upon carefully composed images taken from a tripod, but with his purchase of a lightweight Sony DCR-TRV900, a high-end consumer camera that recorded MiniDV, Pierce began to explore the camera as an extension of his body. The Sony camcorder boasted a single button that would

record when pushed, but stop recording when released; that is, instead of pushing the button twice, the user only need tap and release, which encouraged an improvisatory approach to filming. Pierce described this feature as “a simple technology that transformed my shooting.”⁶⁴ Like most DV cameras, the Sony also included a flip-out screen, which liberated Pierce from the viewfinder, allowing him to move his body and react to his environment while watching his images in real time. Around the same period, Pierce and his wife divorced, and he subsequently re-married. These personal changes, combined with the technology, contributed to a shift to portraiture and embodied camera movement that was absent from Pierce’s tightly controlled shooting on film. “Now it is more that I sense a shot rather than compose it,” Pierce explained. “I shoot with care and skill, but the shooting is fast and physical instead of slow and mental.”⁶⁵

Therefore, lightweight digital cameras allowed for a newly discovered joy in the shooting process stemming from Pierce’s ability to choreograph his camera movements in real time. In earlier interviews, Pierce asserted, “Shooting isn’t making the films; it’s just gathering the materials,” and “The real work for me is the editing of picture and sound; shooting is just a preliminary step.”⁶⁶ More recently, he claims:

Real-time ability is now an important part of my process. When I’m shooting, I’m in performance mode. It’s a thought process that is very much in the moment and is happening continuously, which requires a lot of energy to maintain. I like that pressure. When I decide to shoot, I don’t know what I’m planning to get, I just decide to shoot that day. I might see something attractive based upon a gestural move I make, and then I duplicate the move. I enjoy that state—that’s why I like shooting so much.⁶⁷

Pierce’s rediscovery of the shooting process is evident in his recent videos. *My Person in the Water* (2006) is a self-portrait of Pierce and his wife swimming nude, shot almost entirely from beneath the surface of the lake. Unlike *Water Seeking Its Level*, which more closely adopts the fixed camera position of his film work, this video is highly fluid, as Pierce and his wife trade the

camera between them while shooting. The images are inverted and fragmented as the couple roll and tumble through the water. Arms and legs cut across the frame, again streaked and blurred from the slow shutter speed and digital layering. Trails of white foam ripple across the image, as the mobile camera evokes an idea of fusion, two lovers taking pleasure in each other's bodies while they interact with the world.

Surprisingly, Pierce reinvented his painterly aesthetic again with his adoption of high definition in 2007. Around that time, Pierce purchased a DSLR, a digital camera with a reflex design scheme, which allows it to capture still photographs and moving images. One morning, Pierce began taking stills of a golden pear with an extremely slow shutter speed, moving around his kitchen table in an arc. Like his video images, this produced a heavy degree of streaking and motion blur, but Pierce realized that he could “paint” with these stills in Final Cut Pro in a process somewhat analogous to motion control or animation. All of Pierce's subsequent videos are comprised of sequential still images taken with slow shutter speeds, animated in post-production, and layered to increase the sense of fluidity. Interestingly, Pierce's results are striking because the process is imprecise. Building upon his gestural shooting style, Pierce captures his stills as he circles around an object. Because his movements are necessarily inexact, the blurred backgrounds around the objects are not completely consistent from image to image. Pierce drops the stills, which have been shot with lossless resolution, into his timeline and subtly manipulates the degree to which one frame aligns with the previous. Therefore, the process is very much akin to creating a digital painting that moves in time.

Retrograde Premonition (2010) is an astonishing example of this technique. The video seems to depict a set of actions that occur in a New York apartment at night, with only the reflective neon blue and orange glow of nearby storefronts illuminating the space. Pierce sits in a

chair, his face in profile. He then tracks the camera through the apartment in a point-of-view shot, providing brief glimpses of plants and ceiling lights, moving past the refrigerator to peer over the grated balcony at the shops across the street, and marking the entrance of his wife, who opens a door and gazes out the window. There are fugitive glances at another friend in a doorway and pots on the stove before the video ends with Pierce's wife climbing into a bathtub. This description hardly captures the feeling of the video, however, which is highly disorienting and fragmentary. These events are only glimpsed in pulses of imagery that continually morph and veer unpredictably around, between, and atop each other. There are gaps in Pierce's movement, conveying the sensation of walking to the refrigerator to grab something but only remembering two or three steps along the way. Of course, the slow shutter speed produces streaking, but the overall impression is of a dizzying trajectory with crucial pieces missing, like a memory depicted as a floating daydream.

This effect is partially the result of Pierce's approach to motion blur, an idiosyncratic component of his animation-based working process. Of course, motion blur typically occurs with longer exposure times, resulting in images that are blurred or smeared along the direction of relative motion. In cinema, motion blur is attached to camera movement, so a camera moving from left to right will exhibit motion blur in the same direction. Pierce, however, is digitally animating still photographs, which allows him to liberate motion blur from the movement of the camera. While shooting stills sequentially around an object (say, from left to right), Pierce will sometimes double back along his arc and snap a still, which will display motion blur in the opposite direction. In Final Cut Pro, Pierce can integrate some of these opposite, "right-to-left" stills within a sequence that has a general trajectory of "left to right," effectively using an animation technique to create the appearance of motion blur that moves in the opposite direction

from the camera's movement. In *Retrograde Premonition*, this is especially apparent in the images of Pierce's friend in the window, in which the camera seems to arc around him to the left, but the motion blur from his body and the offscreen light streaks down and to the right.

Pierce's standard definition videos, made with moving images, also used slow shutter speeds and digital layering to engender an Impressionistic fluidity, but the high-definition videos made with still images more radically defamiliarize objects, people, and places. The early videos retain some sense of depth in the image through multiple planes of focus and the representation of movement and gesture as fairly continuous, albeit smeared across the frame. For instance, in *Water Seeking Its Level*, the vibration of Pierce's daughter's foot under the water is slow, heavy, and smeared, but it maintains its integrity as a discrete movement. More recent videos categorically dissolve any sense of space or gesture as discrete or individualized, presenting nearly two dimensional pulsations of sense memory. Pierce makes a helpful distinction between "place" and "space": "I think of *place* as definable, specific—attention surrounding it in a centripetal way. *Space* is centrifugal—going out from a point of view, without edges, not graspable fully."⁶⁸ This notion has ramifications for the painterly aspects of Pierce's cinema, with the still image-based work decisively embracing a more thoroughgoing abstraction. If earlier films and videos reference Turner, Monet, or Degas, later videos are indebted to Pollock or Frankenthaler. For example, a section of *Retrograde Premonition* filmed from Pierce's balcony renders passing cars and storefront lights as nearly unrecognizable swirls of color and texture.

Another way of conceiving the evolution of the "painterly" in Pierce's work is to observe the shift from composed images in 16mm to the total dissolution of the shot in HD. In *Stone Moss* (2009), *Retrograde Premonition*, and *White Ash* (2014), the shot is no longer a meaningful

unit, as Pierce uses digital technology to blend his images in a fluid stream that dissolves discrete segments. Viewers could detect that Pierce's films of the 1990s were made in accordance with a certain regularity of home life. In fact, Pierce recalled that a friend described *50 Feet of String* as an "organic clock": "The bus keeps passing, the mailman keeps coming by, the water keeps dripping, things move forward but not really, they kind of loop around in a never ending spiral."⁶⁹ *Thursday*, for instance, was filmed in and around Pierce's kitchen on Thursday afternoons while his young son napped. While the film is evocative of time and memory, its precise compositions suggest a degree of rigidity, of life organized according to a schedule.

The ability to cut, paste, and layer in digital editing software has allowed Pierce to abandon this sense of the painterly—what we might think of as the still-life tradition—for one rooted in consciousness, flow, and layered time. Pierce states: "I'm interested in perception, memory, and imagination, and how that is both smooth and interrupted. Even though we believe that time is continuous, we don't really experience it that way. When I change my thought, it seems like a break. I'm interested in creating a flow where you can be in one place, then someplace else, but you don't know how you got there."⁷⁰ *Stone Moss*, for instance, is a portrait of a large, cavelike stone formation and the surrounding woods. Pierce uses still photographs animated in layered arcs to explore this open environment, but it becomes difficult to determine the trajectory by which we leave one place and arrive in the next. Images change rapidly, propelling us through trees, past flowers, and along a path, but because there are no "shots," the sensation is one of skipping across an indivisible flow of sound and image that makes no distinction between "here" and "there," or "this" and "that."

As with chemically treating emulsion, designing effects for the lab, and optical printing, Pierce's use of digital shifts visual transformation to the post-production phase. Although the

streaking is captured profilimically, Pierce's stills are then reworked in a manner that suggests a digital-era reconfiguration of multiple roll printing and optical printing. As discussed, the process shares affinities with the film-based aesthetic of *Red Shovel*, but there is no absolute equivalent for the effects that Pierce achieves with a DSLR and non-linear editing software. In his use of multiple simultaneous tracks that allow for slight adjustments to visual parameters over time, Pierce's method is much closer to audio mixing than any filmic process. Instead of discrete units, Pierce uses digital to create a sense of a continuously evolving flow of sounds and images unfolding in time.

For Pierce, the ability to imagine the image track as a flow with vertical dimension is digital's greatest contribution to his aesthetic and working process. He explains:

I can have multiple picture tracks that I mix together (and see the result immediately) in different levels of opacity. I can manipulate speed and do the layering I do to smooth out an image... In doing these things, it allows me to see the image track as a flow rather than a sequence of shots—and a flow with verticality. In other words, it is the digital editing environment ... that allows me to compose harmony (the visual layering) and melody or maybe counterpoint in the image track. It also lets me repeat things with variations at will.⁷¹

In this quote, Pierce suggests that the ideas of “flow,” “consciousness,” and “perception” that he explores in his videos are instantiated in the technology. That is, its design—as a continuous flow of vertical layers—is conceptually similar to the painterly smeariness of his image layering process. Pierce also pursues a musical analogy: The verticality of the graphic representation of the relations between shots allows for musical relationships to emerge visually. Finally, Pierce alludes to the fact that digital's ability to provide immediate results allows him greater freedom to experiment. Unlike film labs or optical printing, where filmmakers were often imagining or trying to predict the results of their decisions, digital allows for effects that can be tweaked, amended, reworked, or deleted practically in real time, granting Pierce the capacity to be more

creative in the moment. Unlike some of the filmmakers posting to FrameWorks, Pierce felt liberated by the ease of use, not anxious about weakening his artistic decision making.

Pierce's videos serve as luminous examples of the resiliency of avant-garde filmmaking paradigms. In searching for painterly images that defamiliarize the everyday and reorient the viewer's perception to the visual complexities of memory and consciousness, Pierce takes a broadly similar approach to 16mm, analogue video, SD video, and HD video. More generally, Pierce extends a storied avant-garde mode, the poetic film, across media by attending to the very characteristics (depth of field, intangibility) that have made other filmmakers skeptical of digital. That said, his methods for achieving these goals have changed with each technology. Manipulation of the 16mm camera lens—through shallow depth of field, diffraction, and composition—has given way to slow shutter speeds, digital layering, and precise adjustments in opacity to both moving images and still photographs. Therefore, there are no absolute similarities and differences in Pierce's approach to cinema, only convergences, rough equivalencies, and contingencies. In their refinement and elegance, Pierce's painterly images fit squarely within an illustrious avant-garde tradition, but what about images that are not as conclusively beautiful? In the case of videos that draw their images from video games, filmmakers marshal different strategies to transform their materials.

Avant-Gaming

In the 2000s, a number of avant-garde filmmakers began to incorporate video game imagery into their films and videos. Some used 16mm or DV to photograph television monitors or arcade games, including Stephanie Barber (*Total Power Dead Dead Dead*, 2005), Scott Stark (*Driven*, 2005), and Michael Robinson (*And We All Shine On*, 2006). Others recorded their own

real-time gameplay directly from home consoles, such as Peggy Ahwesh (*She Puppet*, 2001), Phil Solomon (*In Memoriam (Mark LaPore)*, 2005–2009), and Jacqueline Goss (*Stranger Comes to Town*, 2007). Vast improvements in video game technology provided tremendous amounts of freedom in the ability to explore and manipulate 3D virtual environments. In using video game images, these filmmakers were (perhaps inadvertently) contributing to machinima, a DIY mode of videomaking using real-time 3D game engines that thrives outside of the cinematic avant-garde. Unsurprisingly, filmmakers with avant-garde backgrounds inflected video game images differently, developing new methods of working with games that fit squarely into existing avant-garde paradigms, again demonstrating the elasticity and resiliency of the mode.

One of these methods is a novel approach to visual transformation. On the one hand, avant-garde machinima could be seen as the latest variant of the found footage film—the filmmaker reworks a cultural artifact using a set of defamiliarizing techniques that place the images within new contexts. Given that most of these artifacts are products of mass culture, often filled with violent, misogynistic, and otherwise reductive expressions of dominant ideology, they provide appealing vehicles for subversion.⁷² On the other hand, video games allow filmmakers to generate their own images within the parameters constructed by the game designers. This aspect of video games establishes a productive tension between the inherent constraints of the game and the filmmaker's ability to exploit those constraints for visual innovation and cultural critique. Moreover, some of these videos—especially those with a more elegiac tone—obliquely or explicitly tackle one of the central problems posed by digital cinema: What is a sensuous, arresting, or otherwise compelling image within a digital context? Can images that exist completely outside of the poetic tradition of avant-garde filmmaking be imbued with some of its characteristics?

Somewhat like optical printing, the filmmaker's orientation to his or her materials when working with video games can be described as both tangible and intangible. It would seem that video games fit squarely within the regime of intangibility that is often ascribed to digital technologies. The content is generated by a game engine, a piece of software that produces geometric outlines, the illusion of texture and depth, lighting, artificial intelligences, ambient sounds, and imputes physical properties to figures and objects. Therefore, the imagery is entirely a product of abstract code. The act of playing the game (especially with the intention of making a video), however, is an embodied physical experience involving repetition and variation, trial and error, artistic decision making, and a bodily engagement with the technological apparatus. Avant-garde filmmakers have devised methods to make the process even more physical. Peggy Ahwesh and Phil Solomon, for instance, have become cinematographers of virtual space, orchestrating delicate and precarious maneuvers within the game to "get the shot." Cory Arcangel and Evan Meaney have reshuffled the graphics of the games by modifying the hardware itself.

As noted, machinima is a tradition with its own history, artistic strategies, and generic conventions that operates within a separate context from avant-garde filmmaking. As many overviews note, machinima began in 1996 with the release of *Diary of a Camper*, a narrative video made by hackers using the game engine of the newly released *Quake*, a first-person shooter designed by id Software. Most of the machinima that followed in its wake was produced by gamers for a primarily gamer audience in the form of "demo" reels that played back prerecorded segments of gameplay. In the early days, one could only view these demos by owning a copy of the game on which the machinima was produced. In 2000, the term "machinima" was coined, *Quad God* became the first machinima feature, and machinima.com

was established as the foremost site for its distribution and exhibition, severing the genre from its origins in demo reels. Since 2005, the continually evolving graphics capabilities of game engines, the proclivity for game environments to grow more immersive, and the releases of the latest installments of high-profile games like *The Sims*, *World of Warcraft*, *Halo*, *Grand Theft Auto*, and *Second Life* have contributed to the explosion of the genre, with much of the most sophisticated machinima aspiring to feature film production values.⁷³

The 8-bit and 16-bit graphics of the 1980s and 1990s were not especially appealing for avant-garde filmmakers due to their lack of aesthetic interest and limited possibilities for manipulation. By the 2000s, however, game engines had expanded the capacity for immersion and ludic-oriented gameplay. For instance, *Grand Theft Auto: San Andreas* (2004), the game that Solomon used to make several of the installments of *In Memoriam* (Mark LaPore), boasts a massive number of environments for its protagonist to explore. The state of San Andreas (which is modeled on California) consists of three major cities, plus the rural regions that connect them. Moreover, the player is responsible for performing not only the missions, but also routine daily tasks, such as eating and sleeping. The game also offers possibilities for ludic activity, play defined less by formal structure than by testing the limits and boundaries of the game itself.⁷⁴ Although the narrative centers around the missions that the protagonist must undertake, he or she is not obligated to complete them—the state of San Andreas is so large that a player can opt to neglect the game’s narrative and explore its open-endedness with relative freedom. In fact, one commentator notes that this freedom was a major selling point of the *GTA* series in general, observing that “a player can easily spend hours engaging in non-violent mini-games or traveling the vast expanses of the game world without ever firing a gun or killing a person.”⁷⁵

Admittedly, the history of machinima is only tangentially related to avant-garde filmmaking, especially considering that many filmmakers were unaware of its existence when they made their own contributions to the genre.⁷⁶ That said, certain conventions of “mainstream” machinima production serve as useful heuristics for examining the ways in which the form is remodeled for the avant-garde tradition. At the risk of overgeneralization, most machinima imitates narrative-based filmmaking.⁷⁷ An instructional guide on making machinima cites comedy, action, and drama as major genres, observing that videos in the latter category are “based heavily in the original game world or something visually close to it”—that is, sci-fi games lend themselves to sci-film films, just as mafia games tend to produce gangster films.⁷⁸ Advice on the most common machinima techniques is filled with narrative film-based language like “story,” “script,” “characters,” “action,” and “actors.”⁷⁹ Moreover, scholars such as Robert Jones have noted that, like most new technologies, machinima is “determined in large part by the gender inscriptions imposed by the dominant culture.”⁸⁰ Situating machinima within the histories of other communication technologies, Jones argues that it falls prey to an embedded gendered logic, positioning women as users of technology and men as its masters.⁸¹

It is fitting, then, that the first major avant-garde machinima directly confronts these issues. In *She Puppet*, Peggy Ahwesh appropriates the popular game *Tomb Raider III* (1998) to launch an investigation of gender politics, especially as instantiated in the game’s design. The specific target of Ahwesh’s scrutiny is the game’s female avatar, Lara Croft, a sexy, athletic adventurer who raids ancient ruins in search of rare artifacts. Played by Angelina Jolie in the feature film spin-offs, Croft is a signifier rife with contradictions. Ahwesh observes: “For girls, she’s a role model of empowerment as the female hero with big guns. For boys, she carries a strong erotic charge as the female hero with big guns.”⁸² As deployed in the game, the character

oscillates between activity and passivity, subject to the whims of the player, who exerts a peculiar kind of mastery over the busty female protagonist. Although Ahwesh was not much of a gamer, she was drawn to *Tomb Raider III*'s immersive environments and tangled gender dynamics.⁸³ Describing the game's logic of mastery and control, Ahwesh writes:

Tomb Raider is a third-person game in which the player can hide behind Lara as she advances toward trouble... She is your shield, able and willing to protect you and bear the brunt of each new attack. She is your eyes as you operate the game's "look around" function to orient yourself in a landscape or position yourself to jump off a cliff. A certain intimacy develops. You put her through her paces, practicing the moves over and over without her ever getting impatient. You stare at her body with impunity—mainly her butt—and you get to kill her off in any number of sadistic and pleasurable ways.⁸⁴

In her video, Ahwesh accentuates these aspects of the game's design. Taking her inspiration from the trick films of Georges Méliès, Ahwesh indeed puts Croft through her paces in a series of episodes in which the character acts as a kind of transformer, both the object of our fascination and the victim of our control. In an arctic environment, Croft runs through a labyrinthine underground ice cave, killing several red-jacketed antagonists before being killed herself by a wolf. In a rapid-fire death montage, Croft is executed repeatedly by a variety of means, each time falling to her knees and letting out a guttural sigh before collapsing to the ground. A kettle of angry vultures attacks Croft in a setting that resembles the Grand Canyon, forcing her to take refuge in a cave. Croft repeatedly dives into bodies of water before being devoured by piranhas and left to float downstream. Immediately resurrected, she discharges her pistols and leaps off buildings, almost always with her back to the camera so that the viewer is free to ogle her backside and partake voyeuristically in her exploits. Ahwesh also includes existential voice-overs, read by female voices in the first person, aligning their sentiments with the character's: "Although I walked among them a stranger, no one even noticed. I lived among

them as a spy, but no one suspected. Everyone took me for a relative; no one knew that I had been switched at birth.”

In terms of its formal qualities, *She Puppet* does not resemble Ahwesh’s earlier work, but it shares with her previous films an emphasis on the construction of femininity within a social space. The ways in which Croft has to fend for herself after being besieged and debased in public has affinities with *The Deadman* (co-directed with Keith Sanborn, 1990, discussed in Chapter Two), while *Martina’s Playhouse* (1989), *Strange Weather* (co-directed with Margie Strosser, 1993), and *The Color of Love* (1994, discussed in Chapter One) also feature small groups of protagonists performing femininity in confined and conflicted spaces. Similarly, *She Puppet*’s design provides Croft with only a few circumscribed actions for combating the violence that besets her. She is a performer with a limited number of options. This united *She Puppet* with Ahwesh’s earlier work, the consistency of which has always been more thematic than formal. “I’ve been a hybrid artist since the beginning,” Ahwesh explains. “There’s a certain artistic practice that I employ no matter what the technology is. I don’t use technology to always get a certain look.”⁸⁵ Indeed, Ahwesh has worked in Super-8, 16mm, PixelVision, and video, and her oeuvre includes semi-narrative films made with actors, text-based films, essay films, found footage films, and improvisatory films starring both adults and children.

Due to its conceptual brilliance, *She Puppet* has received a good deal of critical attention. William C. Wees has persuasively argued that the video’s two major strategies of appropriation are deconstruction and defamiliarization. In terms of the former, *She Puppet* thoroughly interrogates Croft’s status as a repository for collective fantasies about sex and violence. Specifically, Wees notes the video’s complicated dynamics of spectatorial agency, in which the cybermastery of the player is linked to his ability to control a “large-breasted, narrow-waisted,

shapely-bottomed, long-legged young woman.”⁸⁶ In terms of the latter, the game undermines the “mise-en-scène, dramatic personae, and action of *Tomb Raider*,” resisting the forms of gameplay encouraged by the game’s designers to pursue a “dreamlike” ambience that Wees links to Maya Deren and Alexander Hammid’s *Meshes of the Afternoon* (1943).⁸⁷ Ahwesh further notes, “Some people read *She Puppet* as a conceptual work, as an alteration of a cultural product—it’s often treated differently from most of my videos or films. It’s seen as an *idea* movie.”⁸⁸

Because other commentators have thoroughly unpacked the conceptual and political dimensions of *She Puppet*, this analysis will focus upon the strategies Ahwesh uses to depart from conventional machinima (which barely existed at the time the video was made) to incorporate video game imagery into avant-garde filmmaking paradigms. Beyond its incisive political critique, *She Puppet* demonstrated three promising avenues of exploration for the avant-garde appropriation of video games. First, by taking advantage of the player-controlled ability to modify some of the game’s built-in design features, *She Puppet* exhibits the degree to which digital video game imagery is susceptible to visual transformation, readily assimilated into the formal grammar of avant-garde filmmaking. Second, Ahwesh highlights the uncanny aspects of the game, the qualities that Wees refers to as “dreamlike.” In *She Puppet*, Ahwesh noticed that the immersive environments of *Tomb Raider III* possessed an odd beauty that exceeded the intentions of the designers and could be exploited. Third, at the level of working process, Ahwesh blurs the distinctions between “playing,” “making,” and “reworking,” submitting video games to the post-production rationale of retroactive manipulation that I argue is an important component of the postwar avant-garde’s approach to filmmaking.

In contrast to most mainstream machinima, which augments or expands the narrative world-building of the source games, *She Puppet* has a non-narrative, modular structure. Ahwesh

partitions her footage into discrete segments that have little connective tissue; Croft has a series of encounters with antagonists of both human and animal varieties, but the video provides no goal or unifying thread. Instead, *She Puppet* could be described as a collection of enigmatic set pieces without linear development. The video can be segmented into eight units that bear thematic similarities, but do not cohere as narrative:

1. Ice cave attack; Croft killed by wolf
2. Croft death montage
3. Nevada desert vulture attack
4. Submersion in water; piranha attack
5. Shooting guns in the baths
6. Prison sequence
7. Egyptian wing of Natural History Museum
8. Nighttime coda

Even within units, Ahwesh consistently subverts narrative logic. In the prison sequence, Croft finds herself threatened by a gang of muscular African American inmates, but the spatial geography is made strange by jump cutting. Croft darts between them, as though to evade an attack, but one of the inmates responds by wandering down the corridor in the opposite direction. Inexplicably, Croft chases him, seemingly shifting tactics, but she stops abruptly in a corner. Ahwesh cuts to a shot from Croft's point-of-view, in which she sees one inmate walk through another, as though he is a hologram, panning right to follow as he walks away. Croft runs around the perimeter of the cellblock before encountering an MP, who proceeds to beat her with a club. Suddenly, the MP is effortlessly killed by the two inmates, who continue to stare menacingly at Croft. An abrupt dissolve takes us to the next scene, which is unconnected to the prison. In this segment, Ahwesh flirts with narrative, suggesting some kind of relationship between Croft and the inmates, but its spatial, temporal, and interpersonal logics are hazy. When the scene ends, it seems more like an illogical encounter than a narrative situation.

Ahwesh also takes advantage of the game's nearly constant barrage of unmotivated and impossible camera movement, which she accentuates through character movement and editing.⁸⁹ An idiosyncrasy of the game's design is the fact that Croft must always appear in front of the "camera," usually with her back to the player. Consequently, when the gamer throws Croft into an abrupt turn, barrel roll, or flip, the virtual camera spins into and then behind her very quickly, completely reorienting the scene. Furthermore, the camera needs to keep up with Croft, almost as though anticipating her movements, so each tweak of the joystick results in a jerking compensation in camera movement within the game. The result is a restless camera that roves around the space and reorients itself to its surroundings like a nervous tic. These constant push-ins and push-outs are fairly standard features of gameplay, but they seem aggressively strange in a cinematic context. Moreover, Ahwesh amplifies this disconnect by punctuating the video's action with shots in which the camera emphatically surveys a landscape or swings around Croft for no discernible narrative purpose. As these unmotivated movements accrue, they begin to seem like parodies of the "prowling camera" style that David Bordwell identifies as central to intensified continuity.⁹⁰

In addition to augmenting the peculiarities of the game's design, Ahwesh's editing is marked by repetition and discontinuity, aligning *She Puppet* with many other found footage films. When Croft is killed by a wolf early in the video, she falls to her knees and expels a resigned guttural sigh. Ahwesh then presents a rapid montage of shots of Croft dying. Although the manner of death is different each time, Croft repeats the same frustrated noise before hitting the ground, whether set on fire, skewered by lightning bolts, ignited by a blowtorch, shot in the face at point blank range, or mauled by a tiger. This orgy conveys the sadism with which death is meted out to Croft, revealing the character's brutal demise as an essential component of the

game's ritualistic structural logic, not solely the endpoint of a gaming session. In other segments of the video, Ahwesh mixes slow and fast cutting, temporal elongation, jump cuts, and irregular rhythms to render the game's actions nonsensical. In the baths, Croft puzzlingly fires assault weapons into shallow pools and brick walls to little effect. Ahwesh introduces a subtle comic touch by including slight temporal and spatial incongruities between Croft's holstering and deholstering of her weapons, the time it takes for a bullet to reach its target, and the overall pacing of the scene, which contributes to the sense that all of the violence is essentially ineffectual, an aimless pursuit in search of a purpose.

In some segments, Ahwesh locates an improbably sensual beauty in *Tomb Raider III*'s prefabricated digital images. In an uncannily ecstatic death scene, a swimming Croft is attacked by a school of piranhas while a soaring aria fills the soundtrack. Her blood is rendered as an iridescent red sphere that shimmers in the background as her body is pulled by the current. The character is propelled through the water, past chunky geometric protrusions that represent the walls of the cave that the stream passes through. Croft's body undulates rhythmically, as though responding to the music. Once decontextualized from their function within the game, the images become aestheticized to the extent that they almost become strangely poetic.

For the most part, however, *She Puppet* forgoes lyricism for a more aggressive approach. "I didn't want to completely pacify the game," Ahwesh explains. "I didn't want it to be dreamlike. Some other filmmakers want their videos to be mellow, more of a dream space. I wanted something more agitated and active."⁹¹ One of the other filmmakers that Ahwesh references could very well be Phil Solomon, whose video game pieces thoroughly recast their exceedingly digital images in the elegiac mode. In Chapter One, I argued that Solomon was heavily invested in the material basis of Super-8 and 16mm film, channeling methods of

emulsion decay for an expressive personal cinema. Because these films were literally handmade, the results of treating the chemical properties of the film's emulsion and reprinting the strips frame-by-frame on an optical printer, Solomon would seem an unlikely candidate to embrace digital filmmaking so wholeheartedly. On the other hand, Solomon's approach to video games is connected to his previous work in the sense that it draws upon a set of representational strategies associated with the poetic avant-garde, specifically compositional austerity, the play of light and texture, and a contemplative, melancholy ambience.

In 2005, Solomon collaborated with his best friend, the filmmaker Mark LaPore, on a short digital video entitled *Crossroad*, which they made as a get-well offering for a mutual friend, David Gatten.⁹² When LaPore committed suicide several weeks later, Solomon drew from the same source material, the popular videogame franchise *Grand Theft Auto (GTA)*, to produce a trilogy dedicated to his memory: *Rehearsals for Retirement* (2007), *Last Days in a Lonely Place* (2007), and *Still Raining, Still Dreaming* (2008–09). With *Crossroad*, the four videos constitute a suite known as *In Memoriam (Mark LaPore)*. Solomon states that the videos are elegies, which certainly seems an apt descriptor for works so imbued with ruminative, atmospheric melancholy.⁹³ This represents a significant achievement in recontextualization, considering that *GTA* has a reputation for being one of the most violent games on the market, consisting in large part of pulling passengers out of cars and beating them with weapons. Because *Crossroad* was conceived spontaneously on what turned out to be the last night that the two friends would spend together, Solomon felt compelled to return to the game to search for answers in the wake of LaPore's death.⁹⁴ The narrative of *Grand Theft Auto: San Andreas* (2004), the installment from which the first three films are derived, involves a protagonist, CJ, who returns to the state of San Andreas (modeled on California) to avenge his mother's killer.⁹⁵

Therefore, the game itself could be described as a narrative of mourning. Through associational logic, Solomon transfigures CJ's loss into personal anguish by using the game as a vehicle to work through his grief over losing LaPore. Solomon explains that CJ's backstory became more relevant after LaPore's death, inspiring him to revisit the game: "I was ... searching for clues and poetic signposts; in effect, I was looking for Mark."⁹⁶

In discussing *In Memoriam*, critics and scholars have tended to argue that the series calls attention to the coldness, emptiness, and immateriality at the heart of digital video through an implicit comparison with cinema. Just as Solomon mourns the loss of LaPore, these videos mourn the loss of film as a material substance, the replacement of "chemistry with code."⁹⁷ Despite the attempts of *GTA* to mimic the corporeality of the physical world, Solomon's ethereal digital landscapes do not really exist, thus forcing the viewer to confront the gap between presence and absence. As we have seen, this disconnect between a material world that compels belief by virtue of its indexicality and a theoretical world that attempts to approximate it by way of intangible abstract code is sometimes thought to be the defining feature of digital video. Gregg Biermann and Sarah Markgraf, for example, note that Solomon's images are "absent, unreachable, and indeterminate—for they exist in the invisible electronic workings of a machine and in the split-second choices made by a user, no two game sessions the same."⁹⁸ Michael Sicinski asks, "How could one look at these images and see anything but loss, the very absence of the phenomenal world and its variegated textures?"⁹⁹

Undoubtedly, *In Memoriam*'s overriding tone is one of sadness and loss, evident in images of solitary figures roaming through oneiric landscapes, hearses burning inside abandoned railroad tunnels, and unworn clothes hanging from a rack in an empty closet. But Solomon's innovation is to amplify the evocative melancholy at the core of the game by submitting

emphatically digital images to techniques associated with the poetic avant-garde. The first of these techniques is an emphasis on compositional rigor. A four-shot sequence from *Still Raining, Still Dreaming* serves to illustrate *In Memoriam*'s compositional logic. In the first, the Brooklyn Bridge at night is pictured from an extremely low angle. A lightly swaying bush that hovers in the upper left of the frame offsets the strong diagonal provided by the tracks. This is followed by another static shot of a house at night, which is perfectly centered in the frame as an airplane glides slowly overhead. The third shot is of an empty factory with paper strewn about the floor, while the fourth features a slow, steady pan across a cramped closet. The camera passes over a woman huddled on the bed with her back to us, her clothes hung on a rack, and finally pauses to observe the shadows that flicker over the murky wallpaper. Such meticulous compositions have led a few critics to suggest that the films exhibit a tableau aesthetic.¹⁰⁰

Precisely framed landscape shots are a hallmark of the poetic avant-garde, familiar from films by Peter Hutton, Nathaniel Dorsky, James Benning, and many others. What makes *In Memoriam* different is the fact that there is neither an actual camera nor a physical place being photographed. Because Solomon's imagery is generated from a game engine, securing a desired composition presents its own set of challenges. Most notably, composing for *GTA* forces Solomon to invent solutions to problems stemming from quirks in the game's design. For instance, in order to produce a shot that does not foreground CJ's presence (unlike Ahwesh, Solomon avoids shots in which the protagonist is visible), Solomon must commandeer a vehicle, which forces the game to adopt CJ's point-of-view. Therefore, almost every shot in *Last Days* and *Still Raining* is taken from a car, motorcycle, hovercraft, or bulldozer, despite the fact that this remains hidden from the viewer. The challenge for Solomon is to figure out how to manipulate the game into letting him drive specific vehicles into restricted locations to secure a

desired composition.¹⁰¹ To capture time-lapse imagery of rays of shifting sunlight piercing through the window of an abandoned factory in *Still Raining*, Solomon had to find a way to drive a motorcycle into the space without falling through holes in the floor.¹⁰² At the level of process, composing arresting shots often entailed devising ingenious ways to circumvent the game's built-in constraints.

Solomon's use of carefully composed images is decidedly cinematic. Video games are coordinate-based spatial arrays, and because they are continually advancing the sensation of perpetual motion, composition tends to be negligible. Solomon, however, imports compositional rigor into the world of video-game aesthetics and plays upon their odd compatibility. He achieves a similar feat with the game's *mise-en-scène* by adapting the avant-garde's longstanding interest in the materiality of the image. As discussed in relation to the painterly images of Peter Hutton, Nathaniel Dorsky, and Leighton Pierce, the avant-garde has always been deeply engaged with the palpable quality of light inscribing an image into emulsion (or an image sensor), especially the ways in which film stock, lens optics, and layering techniques transfigure the world while retaining a tenuous connection to reality.

Early in *Rehearsals for Retirement*, we are presented with a 34-second shot depicting parallel train tracks underneath an arching brick enclosure, suggesting a subterranean space or dark passageway. It is raining heavily, and the drops bounce off the walls and tracks. Some of the drops disappear, while others form exaggerated splashes on the ceiling, walls, and ground, which, of course, is logically inconsistent with real-world rainfall. Meanwhile, sheets of mist emanate from deep inside the tunnel and proceed to march into the foreground. Strangely, the mist appears uniform, as though it has molded itself to the shape of the tunnel. Although it is clearly meant to register as mist, it also resembles sheets of light, producing a hologram-like

effect. In this shot, the mist seems exceptionally delicate precisely because it appears pliant and otherworldly, almost like a hallucination. It should be noted that *GTA: San Andreas* marked a maturation for the series in terms of graphic rendering and interactive play, with many videogame aficionados lauding the level of detail attained by the game's designers.¹⁰³ That said, Solomon heightens the attention to detail already present in shots like this one, which accounts for the strong sense of atmosphere. In videogame scholarship, aesthetics are frequently downplayed, but given his background in avant-garde filmmaking, Solomon takes an interest in these games chiefly for their "dreamy, haunted landscapes," which provide him with the tools to generate his own evocative images.¹⁰⁴

In the gaming world, the ability to render environments with precise detail is usually situated within the context of realism, but this becomes complicated with regard to *GTA*. While the series has been responsible for drawing attention to improvements in graphic realism, the games are not visually realistic, at least not in the sense that they mimic how we are accustomed to seeing the world. For example, many of the game's images are rendered with the spatial distortion and exaggerated depth associated with a wide-angle lens, whereas the flatness of characters against the background simultaneously suggests a telephoto lens. Colors tend to be slightly oversaturated. As has been mentioned, raindrops pop off the ground in a way that seems overstated, even aestheticized. Solomon states: "What intrigued me most was the strange poignancy I felt in the game's polygonal aspirations, its desires to be of the real world that fell short in very interesting ways."¹⁰⁵

In this passage, Solomon suggests that he intuited a poignancy in the game itself, but in his videos, he develops this quality by drawing upon the poetic avant-garde's emphasis on atmospherics to underline the artificiality of the game's attempts at realism. Most

straightforwardly, he uses the menu to adjust the game's interior settings, altering color, brightness, and contrast levels. *Rehearsals* is marked by a pervasive aqua-blue haze and very deep blacks. This schema persists in both interior and exterior locations, uniting disparate spaces and suggesting a self-contained world of quiet melancholy. The desaturated black-and-white of *Last Days* surprisingly introduces a slight graininess, which strengthens its connection to the 16mm tradition. In *Still Raining*, soft focus results from purposefully tilting the camera up to the sky during a rainstorm to get the "lens" wet.¹⁰⁶ Moreover, Solomon can modify the "available light" in the game itself by knocking out streetlamps and car headlights, which is akin to orchestrating key and fill lights "on set." In many ways, Solomon's concerns are similar to those of a traditional cinematographer, but his choices are determined by menu settings and design contingencies instead of a light meter.

In addition to establishing an overall tone or ambiance, Solomon pushes the boundaries of the game's mise-en-scène through the judicious use of cheat codes to extend the usual capabilities of regular gameplay. A cheat code is a series of buttons that the gamer inputs into his controller to introduce modifications that are not officially part of the game, although these effects are programmed by designers as challenges to users, who discover them and post the combinations online. *In Memoriam*'s most conspicuous enhancements are the extensive use of time and weather cheats. Time cheats permit Solomon to change from day to night at will. More importantly, weather cheats are featured in virtually every shot in the series. In all four films, Solomon conjures rain, thunderstorms, and overcast skies, which are used in conjunction with different environments for specific effects. In *Last Days*, a light rain lends the forest setting a glistening sheen, while the intense thunderstorm in *Rehearsals* causes the ocean to respond violently, appearing menacing and dark. By contrast, the storm in *Crossroad* is accompanied by

sudden bursts of lightning. Other enhancements include generating (or “spawning,” in the game’s parlance) a hearse and forcing planes to drop from the sky.

Game designers deliberately program cheat codes into their games to engage with their most ambitious fans. Some effects, however, are unintended. These “glitches” are programming errors that can be exploited by the gamer to induce effects that theoretically should be impossible. In *In Memoriam*, Solomon tends to use these glitches to juxtapose incongruous elements. *Rehearsals* contains a shot from inside a hearse as it moves slowly through a wheat field; bizarrely, the stalks of wheat appear inside the car, as though its boundaries are somehow permeable. Similarly, rain falls and fires burn inside an empty hotel lobby in *Last Days*. A bouquet of flowers that allows CJ to court romantic partners in the game is used poetically in *Crossroads* and *Rehearsals*, inserted into incompatible spaces and left to float endlessly. These glitches are especially suited to Solomon’s aesthetic precisely because they are not overstated. In these shots, the *mise-en-scène* is thrown off-kilter by a single dissonant element, fostering an aura of poetic mystery, much like Andrei Tarkovsky’s *Mirror* (1975) or *The Sacrifice* (1986).

Through compositional rigor, an emphasis on texture, and the ingenious subversion of *GTA*’s violence through internal manipulation of the game, Solomon transforms digital video game imagery by placing it within robust cinematic contexts. For Solomon, digital working methods entailed a full-scale reinvention of his practice. Although he has always favored the elegiac mode, *In Memoriam* (Mark LaPore) does not bear much visual resemblance to his celluloid-based work. By contrast, *The Extravagant Shadows*, David Gatten’s first foray into digital cinema, is a clear extension of the visual qualities, working processes, and thematic concerns that the artist has been developing since the beginning of this career. In the following analysis, I examine a complicated instance of an emphatically 16mm-based, materially minded

filmmaker adapting his practice for a new medium by reconfirming the validity of established avant-garde modes.

The Extravagant Shadows

David Gatten's *The Extravagant Shadows* represents an extraordinary example of a 16mm-based filmmaker adapting his aesthetic and conceptual concerns, as well as his working process, for digital video. In earlier chapters, I discussed Gatten's investment in 16mm through his unique approach to the filmstrip in the *What the Water Said* series (1997–2007) and complex orchestrations of fades and dissolves by multiple roll printing at the lab, which I argued constituted a “cinema of cadences.” With his first video, Gatten improbably created his magnum opus by reviving an outmoded genre: “The Structural Blockbuster” of the 1970s, a long-form, large-scale, systematic work that synthesizes a filmmaker's central preoccupations, associated with Michael Snow (*La Région Centrale* (1971), ‘*Rameau's Nephew*’ by Diderot (*Thanx to Dennis Young*) by Wilma Schoen (1974)) and Hollis Frampton (*Hapax Legomena* (1971–72), *Magellan Cycle* (unfinished, 1974–84)). With *The Extravagant Shadows*, Gatten exploits the possibilities of digital video, taking an ingenious and audacious approach to visual transformation that suggests that artists will continue to adapt the tools available to them to provide viewers with startling perceptual experiences. More specifically, the video also addresses the problems of hyper-clarity and physical intangibility that animated the digital debate within the avant-garde.

Before discussing *The Extravagant Shadows*, however, it is important to establish a sense of Gatten's 16mm-based cinema. Elsewhere, I have argued that Gatten's work is the foremost exemplar of New Historicist Film, a recent avant-garde subgenre characterized by its complex,

and often, labyrinthine engagement with history, especially through an emphasis on material culture—the study of historical texts, objects, and artifacts as representative of cultural and social relations in a particular period. Gatten’s films are noteworthy for their incorporation of more speculative questions about historiography and epistemology, often reflecting upon the systems that humans have devised to understand themselves and the world. Frequently, these films grapple with histories drawn from other disciplines: literary, philosophical, colonial, biological, and medical. In many cases, they are pluralistic and associative in their borrowings, evidencing a strong interest in antiquarianism. Gatten’s most lauded cinematic achievement is *Secret History of the Dividing Line, A True Account in Nine Parts* (1999–), a projected series of nine films (of which four have been completed) that take as their subject William Byrd II of Westover, an 18th-century plantation owner and politician who led an expedition to map the original dividing line between the states of Virginia and North Carolina, as well as owned the largest library in the colonies, which became the basis for the Library of Congress.¹⁰⁷

In evolving this work, Gatten took an ingenious approach to handmade cinema that emphasized unconventional processes, tactile surfaces, and 16mm film as a malleable substance upon which traces of history, memory, and time could be inscribed. In many respects, this is the subject of Gatten’s second film, *Hardwood Process* (1996), an exploration of communicative legibility that highlights the marks on the filmstrip. As a student, Gatten visited Philip Hoffman’s Film Farm in Canada, where filmmakers are taught to process their own films in buckets and spray the strips with a garden hose. Gatten recalled, “In the process the film might fall on the rough floor and you might step on it; the dog might come over and chew on it... When my film was projected, I was excited because I could see not only what I’d photographed, which was one kind of record, but also that many of the marks on the surface of the film were *legible*.”¹⁰⁸ For

instance, in the film's fourth section ("DAY 123 — travelogue (silent film)"), shots taken in and around a farm (of a woman touching the wall of a cabin, hardwood floors, a wooden fence on a hillside receding into the distance, and a window inside the cabin) are hand-processed and heavily pockmarked. White scratches, blotchy discolorations, and dirt particles race across the film's tinted surface, threatening to engulf the images.¹⁰⁹ In addition, some of the imagery in the film was made with eccentric direct filmmaking techniques, including lifting dust off the floor with cellophane tape and making contact prints of it in the darkroom.¹¹⁰

In his Byrd films, Gatten experimented intensively with processes that foregrounded the 16mm filmstrip's status as a physical object. As discussed in Chapter Two, *Moxon's Mechanick Exercises, or, The Doctrine of Handy-Works Applied to the Art of Printing* (1999) involved affixing Scotch tape to books, boiling the paper away, printing the imprints of the words on the tape onto high-contrast film stock, and magnifying the images in an optical printer. For *Secret History of the Dividing Line* (2002), Gatten physically tore the strip in half and then taped it back together, creating a long vertical slash that divides the left and right sides of the frame. In the second section of the film, Gatten used a misaligned splicer to make cement splices that he subsequently took apart and rephotographed on the optical printer. When magnified, the cement residue left on the strip makes the splices seem like the vast terrain of rocky landscapes; the film presents 57 splices, one for each location of an expedition taken by Byrd to map the boundary between North Carolina and Virginia in 1728.¹¹¹

Gatten's uses of the cement splicer and optical printer are highly unusual in that he often uses them to generate imagery rather than rework something that he shot previously. According to Gatten, "the idea of working physically with editing materials—with the tape and a cement splicer—to actually produce images, not to edit, was for me a revelation."¹¹² In his film work,

this method produced instances of visual transformation that emphasized the tactility and, in some cases, instability of his materials. For *Film for Invisible Ink, case no. 323: ONCE UPON A TIME IN THE WEST* (2010), Gatten placed pine pollen and flowering plants onto the filmstrip and rephotographed them in the optical printer in high-contrast black-and-white. Swirling blobs of inky black expand and contract as Gatten rack focuses through the layers, creating a sense of immersion. The deep blacks of the flowers are flanked by the spectral grey of the pollen, which is shot through with the backlight of the printer as it illuminates the clear leader. As Gatten deftly moves through each layer, it produces an ebbing and flowing of natural materials that paradoxically conveys an almost unearthly beauty.¹¹³

In Chapter Two, I also discussed Gatten's desire for a "cinema of cadences," which he pursued primarily through onscreen text. In the Byrd films, Gatten wanted to explore the point at which text registers purely as image, which entailed devising multiple sets of long fades that occurred simultaneously. Working with multiple rolls of film, but limited by the lab's restriction of fades to 16, 24, 32, 48, 64, and 96 frames, Gatten experimented with a delicate choreography of fades and dissolves to affect rhythm and pacing. In the most recent Byrd film, *The Great Art of Knowing* (2004), Gatten presents an intricate match-game of textual fragments based upon the structure of Ludwig Wittgenstein's *Tractatus Logico-Philosophicus* (1921). Starting with Wittgenstein's famous opening statement, that "the world is all that is the case," poetic lines of text drawn from various sources fade in and out at irregular intervals, sometimes repeating, other times not. These fragments offer an indirect summation of all the film's major themes, as lines from one source seem to reference another. Furthermore, certain quotations are left onscreen to linger while others fade in and out, so that the meaning of a given line is constantly changing in relation to what appears above or below it.

Given that Gatten's working processes are so firmly associated with the delicacy and tactility of 16mm film, it is ironic that the densest expression of his predominant formal and conceptual concerns would be a digital video. Running nearly three hours, the experience of viewing *The Extravagant Shadows* is somewhat difficult to describe. The video begins with an overture: "Angel on My Shoulder," an obscure 1960s-era pop song by Merrilee Rush, famous for her hit "Angel of the Morning" (heard later in the video), which plays under a black screen. The first image is a tight close-up of colorful book spines, older editions of volumes by Henry James, Alexandre Dumas, Charles Dickens, and Nathaniel Hawthorne, among others. Suddenly, a sheet of glass is placed in front of the books, and we see reflections of Gatten, a DSLR camera, and surrounding greenery, suggesting that the video is being shot outdoors. Gatten's hand, holding a paintbrush, enters the frame, and he paints the entirety of the glass pane butter yellow, using tight vertical brush strokes. As the paint dries, the hue shifts to brown, and Gatten's hand enters frame again, re-painting the panel blue.

The spines of the books remain faintly visible as a title card, and then blocks of text, begin to emerge from the paint: "The idea is one of contingency," "What tenderness of attention might mitigate the battered experience of the over-looked, the un-chosen, the unseen or the disallowed?" This sets up the basic architecture of the film, which repeats for most of its duration. Gatten paints the glass in real time, which takes anywhere from two to five minutes. Sometimes the paint covers the previous layer, providing a relatively neutral background, but at other instances, previous colors bleed through as the top layer dries. When he finishes, a more or less full-frame panel of written text slowly fades in, becoming increasingly legible before receding back into the paint, a process that takes about one minute to complete. After several

panels of text, Gatten will re-paint the glass, and more text will appear. At five separate points in the film, the viewer hears songs by Merrilee Rush.

The words themselves are primarily an oblique exploration of the poetics of Henry James, forming a narrative and a kind of meta-commentary on that narrative that become gradually interwoven. Gatten explains that his interest in James stems from James's facility with language to circle around internal emotional states and external narrative events without stating them directly: "James makes visible the process of thought, which of course happens very fast, but through his use of language, he slows it down so that we are able to understand someone else's thinking. A character's, but also his own, with all the hesitations and circling back in slow motion, which allows for analytic examination."¹⁴ Over the course of the video, thematic parallels between the writing and the painting assert themselves, sometimes explicitly (references to dampness, humidity, and book spines in shop windows), but mostly implicitly, as a dialectic between abstraction and representation, stillness and movement, time and space, and the processes of memory and history. Throughout its long duration, cognitive gameplay emerges, as the viewer tries to anticipate, remember, and form patterns: What was the last color? When will Gatten paint the next color, and what will it be? Will he break the pattern of the system? (Ultimately, Gatten paints the glass a total of 35 times.) Meanwhile, we attempt to follow the narrative one panel at a time, as though reading a book without the ability to turn back the pages and scan what may have been missed.

Most commentaries on *The Extravagant Shadows* imply that the specificities of the narrative are less important than the conceptual issues that arise from its instantiation within the film's form, or even that the story itself is relatively transparent. Tellingly, none spells out the details of this narrative apart from the fact that it tells of lovers across time, which suggests that

the story is perhaps harder to discern on first or second viewing than it seems. The writing results from a “condensation procedure” in which Gatten combines his own writing with fragments of text from James, Stefan Zweig, Maurice Blanchot, Wallace Stevens, and other sources, reassembling them into a narrative that borrows characters, themes, and incidents from various James stories but is ultimately Gatten’s invention.¹¹⁵ Although it is a bricolage, the writing always seems unified in its adherence to the elliptical style of late Henry James. For instance, a sample panel reads:

Well, it was all confounding enough, but this indication in particular would have jostled our friend’s grasp of the presented cup had he had, during the next ten minutes, more independence of thought. That however was out of the question when one positively felt, as with a pang somewhere deep within, as even with a smothered cry for alarm, one’s whole sense of proportion shattered at a blow and ceasing to serve. The cause was clear enough; then came the second telegram.

Although it has been less discussed, the language itself relates to Gatten’s work with digital technology, so the narrative is worth elaborating in more detail.

The text is organized according to a complicated nesting structure. The narrative and the meta-commentary are each assigned a series of Roman Numerals, but Gatten interweaves them, so the numerals begin to converge at the video’s midpoint. The video proceeds by way of a frame story derived from James’s “The Birthplace,” in which a couple is recruited to house-sit for their friend, a noted literary critic, whereupon they stumble upon a manuscript by a famous author (suggested to be a James-like figure) dotted with their friend’s marginalia. For the next hour, we are presented with the contents of the manuscript as it is read aloud by the couple. Borrowing from James’s “In the Cage,” the narrative tells of a businessman who has a surreptitious affair with a telegraph operator. Their relationship is punctuated by silences, intervals apart, and clandestine communication. Sending messages via telegram, the couple arrange meetings, contemplate fleeing to China, and in a point-of-view shift, the woman waits

for his reply in her room, burns a set of papers, and ponders the unpredictability of fate. At 46 minutes, a single line of text informs us that “years passed by.”

This initiates something of a breakdown in the video, and the next 50 minutes are dominated by more oblique panels of text that suggest a rupture in the relationship. In associative logic familiar from Gatten’s New Historicist Films, this writing directly bears upon the story, but at first appears confounding. We see a panel derived from Stefan Zweig informing that catastrophic, disastrous occurrences can be instigated by relatively insignificant events. There are a series of panels that reference separation: a frantic search for a telegram presented in elliptical fragments; compilations of phrases culled from the China Inland Mission Private Telegraphic Code; instructions for senders and receivers of telegrams salvaged from The Missions Code; lyrical fragments from “Angel of the Morning”; and a metaphorical section about sound absorption that alludes to both the separation of the couple and the painting process, which is temporarily suspended as Gatten seamlessly dissolves to eight minutes of the walls of actual domestic interiors, which resemble the painted surface of the glass.

This material is anchored at the end of the second hour, as Gatten returns to the manuscript’s narrative. Many years later, the woman finds a volume in a bookshop that reminds her of those turbulent years: the couple arrived in China but were pursued, they separated with the promise of clandestine communication via telegram, but a misunderstanding of telegraphic code thwarted their rendezvous. He died tragically, and she found herself in Bristol mourning his death. In a dusty shop full of books with thematic resonances to their past, she chooses an unnamed volume, brings it home, and feels his presence in the room as she reads. She gives herself to the past as rediscovered through language. There follows an interlude in which Gatten repeatedly paints the pane of glass, and the viewer hears songs by Merrilee Rush.

The final hour of the video is both a continuation of the narrative and a treatise on language culled from Maurice Blanchot and Wallace Stevens. First, the author of the manuscript (or perhaps the dead lover) articulates something close to a poststructuralist position on language: Despite its exquisite precision, language is completely elusive, meaning constantly deferred and slipping away, and each attempt at communication fractures into a subjective skimming over the words onto other words and other meanings. From Stevens, Gatten advances the countervailing position that language is less about representation than a reconstitution of the objects described, endowing them with affective sense values and enhancing meaning. In a poignant reference to the preceding narrative, the text affirms that there is something vitally human about finding oneself in a story, and that surrendering to language is ultimately transformative. *The Extravagant Shadows* ends with a panel of text that links words with our relations to each other, asserting their vitality in shaping how we interact and form meaningful relationships in and with the world.

Despite Gatten's attachment to 16mm, *The Extravagant Shadows* directly addresses many of the charges levied against digital video from analogue purists. For instance, Gatten exaggerates digital's reputation for flatness by producing a three-hour film with almost no depth. Gatten's cinema has always tended toward flatness, as his experiments with text often inclined toward austerity, but in *The Extravagant Shadows*, the background consists almost entirely of a sheet of painted glass with all of the video's "action" relegated to the act of painting and the appearance and disappearance of the text. This flat background creates a boundless expanse that the viewer metaphorically occupies. The painting and reading is hypnotic and absorptive, encouraging the viewer to mentally project himself or herself into the "space" of the narrative in the absence of direct pictorial representation. Interestingly, Gatten also undercuts this sense of

flatness by exploiting HD's ability to capture the texture of the paint in exquisite detail. The shot scale is tight enough that viewers can perceive each crack and fissure, each indentation as the bristles on the brush are pressed into the pane, and the small pockets of air bubbles that roil on the surface. When Gatten covers the glass with a heavy brushstroke, the paint appears tactilely wet. In its long series of literally painterly images, *The Extravagant Shadows* seeks to prove that watching paint dry can in fact be an engrossing experience.

The act of painting also counteracts digital's intangible ephemerality. In Gatten's earlier films, the handmade processes were unconventional but easily assimilated into the protocols of direct filmmaking. In *The Extravagant Shadows*, the work of splicer, tape, and optical printer is displaced onto a physical process that occurs in front of the camera. If the 16mm films "masked" the operations that formed their images, Gatten's video focuses the viewer's attention on the process of artisanal production. The experience of watching Gatten paint heightens our awareness of gesture, movement, and artistic labor. By the conclusion, the video has seemingly presented an inventory of possible methods for painting glass, from vertical vs. diagonal brushstrokes to starting from the left or right vs. the middle to approaches that range from methodical to haphazard. Adjusting to the unfamiliarity of the digital workflow, Gatten noted that he "didn't have the satisfaction of the dark room and the rewinds and the splicer, which to me is this very satisfying physical process that goes alongside the aesthetic thinking and conceptual work of a film."¹¹⁶ Almost as if compensating, *The Extravagant Shadows* places the artisanal work of filmmaking directly at its profilmic center.

Moreover, the video invites viewers to study the effects of mixing paint in real time. In *The Extravagant Shadows*, the chemical reactions that resulted in films like *Hardwood Process* and *Moxon's Mechanick Exercises* are replaced with physical reactions occurring in front of the

camera, captured in high-definition clarity. In the video, Gatten deliberately layers acrylic over oil-based enamel, two paints that are not typically mixed. As the opening image hints, the painting occurred outside of Gatten's home in Salinas, Colorado, where the relative humidity is extremely low in the summer months. Consequently, humidity and sunlight affect the materials, producing a high degree of variability in the reaction of the paints.¹¹⁷ Following the conclusion of the manuscript's narrative at around two hours, Gatten paints the glass a vivid royal blue with a thick, wet application that imbues the paint with a reflective sheen. Almost immediately, he repaints the glass peach, but the wetness of the blue makes it difficult to cover. After finally accomplishing his task, Gatten pauses, and we watch a physical transformation occur in front of our eyes—the blue bleeds through the peach in weeping willow-like clusters that resemble fireworks. Gatten soon repaints the panel with a neutral white, but the blue again seeps through the layers, now creating the appearance of sponge painting. Even in digital, Gatten conceives of the cinematic as a set of alchemical and transformative processes.

Of course, Gatten also uses digital technology to reconsider his predominant formal concern, the aesthetic function of onscreen text. As noted, a major stumbling block to Gatten's use of multiple roll printing to orchestrate fades and dissolves of text was the lab's inability to produce fades longer than four seconds. Gatten first conceived of *The Extravagant Shadows* in 1998, primarily as an experiment in textual fades that would hover at the brink of legibility for minutes. Because this was impossible in film, Gatten knew that he would need to use video. Over the years, he attempted combinations of text and analogue video, but it was not until the advent of non-linear editing that Gatten found the means to realize his aspirations.¹¹⁸ The minute-long fades of text in *The Extravagant Shadows* allow Gatten to structure the viewer's reading experience over time, accommodating a greater variety of reading practices than his

earlier work. While we have time to read each panel, sometimes the density of information overwhelms, so we must adapt different approaches to comprehension. Do we scan each panel quickly to get the gist, and then re-read to fill in gaps? Or do we closely read line-by-line but run the risk of missing crucial details? Do we read with uniform speed, or do we rush through the beginning, middle, or end of a panel?

In Gatten's 16mm films, there is often more text than the viewer can read at a given time, or text that has been submitted to the boiled book technique and rephotographed on an optical printer so that it registers as a purely visual element. Before screenings of his films, it became customary for Gatten to state: "There will be a lot of words in these films. You won't be able to read all of these words. I expect that this will provoke anxiety. That is as it should be."¹⁹ *The Extravagant Shadows* retains some interest in text as a visual element, especially in those moments when one panel of text dissolves into another. Because Final Cut Pro allows Gatten to arrange his text precisely, he sometimes dissolves two panels with the writing exactly aligned, so that a block of text visually transforms into another. At other times, one panel overlaps its predecessor in a weave, so that the result is a wall of word soup, effectively doubling the number of words in a given panel at the moment of transition. In Part VI of *The Extravagant Shadows* (occurring around 56 minutes), Gatten revives the textual match-game of *The Great Art of Knowing*, replacing lines of text in a vertical column, but the precision of digital dissolves allows for subtler transitions, which make some of the transformations more difficult to catch.

That said, the text in *The Extravagant Shadows* is generated from the "Title" function in Final Cut Pro, which means that it retains the crisp clarity and uniformity of word processing. Although Gatten applies a slight blurring effect to the text to soften it, the words are always legible. In his analogue films, text was a demanding element because it was often obfuscated or

visually inaccessible. In *The Extravagant Shadows*, the digitally rendered text is always readable, but the language itself is more abstract. Gatten affirms that his recent work is “less now about physical, visible legibility and more, I think, conceptual legibility or illegibility.”¹²⁰ Indeed, Gatten does not disguise the fact that the text is digitally produced, not unlike reading from a computer screen or e-reader. The challenge is the viewer’s ability to comprehend the words, to structure a narrative and its paratext over the course of several hours without the ability to pause, turn back the pages, or slowly contemplate nuances and shades of meaning. In this case, the specificities of the technology contribute to the sense that *The Extravagant Shadows* is Gatten’s most measured film; there are no hurtling words, only consistent rhythms that emanate out of the paint, hover for a short time, and dissolve.

Gatten’s use of digital technology also affects the viewer’s sense of duration. One of the most striking features of *The Extravagant Shadows* is that it seems to be a real-time performance. Although an attentive viewer will realize that this is an impossibility (it was shot over the course of weeks), the video creates the appearance of being captured in a single shot; even the mid-video fades to actual architectural spaces do not completely destroy the illusion. Gatten planned meticulously before filming, timing the duration of all the panels and using a stopwatch and copy of the script to time the gaps between painting during the shoot.¹²¹ He then made adjustments in editing through the use of long dissolves, which remain imperceptible for the viewer due to the relative stability of the background. Consequently, *The Extravagant Shadows* is both a scripted performance and an edited enhancement of a performance that functions to create an immersive experience. Digital editing software in conjunction with real-time elements is used to simulate a seamless, integrated flow of text and image that seems to emanate from a unified space and time. In the video’s final moments, Gatten removes the sheet of glass, and we return to the opening

image of the book spines. It is as though we have entered the paint, had an experience in real time, and then come out of it, a climactic gesture that proves surprisingly cathartic.

As with the other filmmakers whose videos have been discussed, Gatten's shift to digital precipitated a series of changes to his working process. In contrast to previous films, Gatten confessed that "this was sitting at a computer and it was clicking things, and that was not poetic but it was satisfying in its results and in the level of control."¹²² Interestingly, the most significant difference was the level of concentration that Gatten could afford to bring to the text itself, rather than the physical processes that dominated his use of 16mm: "Working digitally gave me the space to develop that writing; I hadn't had the space or the inclination to do this working in celluloid."¹²³ In this way, digital editing software has augmented the postwar avant-garde's emphasis on "post-production" methods of revision and reworking, offering an unprecedented degree of control over transformation of the image. That said, the nature of this process has changed dramatically. Even the optical printer, which some filmmakers have characterized as cold, distant, or removed from the operator's body, seems physical and tactile by comparison.

The Extravagant Shadows underlines the number of congruities between 16mm and digital, demonstrating the resiliency of the formal paradigms and working processes of the cinematic avant-garde. In a new medium, Gatten retains his most pressing aesthetic and conceptual concerns, including the philosophical investigation of language as it stages itself over time, the physical transformation of the materials, and the associative approach to content typical of New Historicist filmmaking. But these thematic components have been reshaped by the constraints of new technology. Digital's characteristic visual clarity and physical intangibility result in Gatten's use of flatness and high definition to highlight the artisanal work of

filmmaking. The “Title” function in Final Cut Pro 7 leads Gatten to pursue approaches to onscreen text that provide new reading experiences for the viewer, especially in terms of duration and legibility. Finally, Gatten’s propensity for highly structured viewing experiences is transformed by his ability to simulate a real-time durational performance that incorporates nested payoffs for the viewer over the course of several hours. In that sense, *The Extravagant Shadows* does what much of the avant-garde has always done: look to the future while respecting its past.

Conclusion

Unlike some of the other technologies discussed in this dissertation, digital is an ongoing phenomenon. As the technology evolves, the avant-garde will continue to mourn the demise of film while celebrating new possibilities. In the first 15 years of the medium’s existence, the contributions of the avant-garde to digital filmmaking have already been substantial. This is a testament to the resiliency of the tradition, even when faced with the diminishment of the medium that was central to its sense of identity. In this chapter, I have argued that despite significant changes in technique and working process, digital has been thoroughly assimilated into the avant-garde’s formal and conceptual paradigms, an achievement to be lauded rather than bemoaned. The advent of digital invigorated an often productive debate about the legacy and mission of the avant-garde, clarifying two of the medium’s most defining constraints: hyper-clarity and immateriality.

Filmmakers responded to these constraints as they always have—by incorporating them into their practice. Leighton Pierce subverted them by developing a painterly aesthetic rooted in slow shutter speeds, gestural camera movement, and digital layering, which transformed digital’s crisp clarity into a streaked Impressionism that evoked the flow of consciousness, memory, and

time. Peggy Ahwesh and Phil Solomon improbably turned to digital video games in a novel reinvigoration of the found footage tradition that emphasized cultural critique, disjunction, and an unlikely poeticism. David Gatten directly confronted the medium's constraints by using digital to amplify the preoccupations at the heart of his film-based work, integrating them into his established working processes. Ingeniously, their videos reformulate a persistent set of concerns that are by now familiar: visual transformation, materiality, amateurism and professionalism, the avant-garde's imbrication with other filmmaking modes, and medium specificity.

¹ Jacobs quoted in Flo Jacobs, Ken Jacobs, Luis Recoder, Lynne Sachs, Mark Street, Malcolm Turvey, and Federico Windhausen, "Roundtable on Digital Experimental Cinema," *October* 137 (Summer 2011): 55.

² *Ibid.*: 57–59.

³ *Ibid.*: 65.

⁴ *Ibid.*: 55–56.

⁵ *Ibid.*: 62.

⁶ John G. Hanhardt, "The Medium Viewed: The American Avant-Garde Film," in Marilyn Singer, ed., *A History of the American Avant-Garde Cinema* (New York: The American Federation of Arts, 1976), 22.

⁷ Windhausen argues that digital's assimilation by the avant-garde "reflects the extent to which the avant-garde has demonstrated itself capable of reconfiguring its practices and techniques without relinquishing its core values." Windhausen, "Assimilating Video," *October* 137 (Summer 2011): 71.

⁸ For an analysis of the changes to mainstream cinematography inaugurated by the digital revolution, see Stephen Prince, *Digital Visual Effects in Cinema* (New Brunswick, NJ and London: Rutgers University Press, 2012), 56–98.

⁹ Lev Manovich, *The Language of New Media* (Cambridge and London: The MIT Press, 2001), 306–307.

¹⁰ For a history of this tradition, see Chris Meigh-Andrews, *A History of Video Art*, 2nd ed. (New York and London: Bloomsbury Academic, 2014).

¹¹ See Rosalind Krauss, "Video Art: The Aesthetics of Narcissism," *October* 1 (Spring 1976): 50–64.

¹² See Prince, *Digital Visual Effects*, 11–55.

¹³ *Ibid.*, 20–21.

¹⁴ For a far more detailed account of the studios' early incorporation of digital into the production sector, see David Bordwell, *Pandora's Digital Box: Films, Files, and the Future of Movies* (Madison, WI: The Irvington Way Institute Press, 2012), 22–45.

¹⁵ See Andrew Johnston, *Pulses of Abstraction: Episodes from a History of Animation* (Minneapolis: University of Minnesota Press, 2016).

¹⁶ Prices are derived from Ean Houts, "Premiere Upgrade Makes Minor Speed Increase," *Infoworld*, July 8, 1996: 106; Jim Perry, "Final Cut Pro 1.2.5," *Computer Graphics World* 23.10 (October 2000), <http://www.cgw.com/Publications/CGW/2000/Volume-23-Issue-10-October-2000-Final-Cut-Pro-1-2-5.aspx>; and Brad Gibson, "Media 100 Ships CineStream," *PCWorld*, March 1, 2001, <http://www.macworld.com/article/1020607/cinestream.html>.

¹⁷ For information on Betacam, see the instructional manuals housed online: http://www.thameside.tv/product_PDFs/bvw75.pdf; http://www.thameside.tv/product_PDFs/dvwm2000.pdf.

¹⁸ George Mannes, "Double Your Bits," *Popular Mechanics* (December 1995): 57–59.

¹⁹ Pip Chodorov <frameworks@re-voir.com>, "Re: suggestions for Pip and others," 7 February 2004. Note that FrameWorks keeps an archive at <http://www.hi-beam.net/fw/index.html/>, but e-mails are taken offline three years after their initial posting. Older posts can be requested from filmmaker Scott Stark, who maintains the list. His e-mail address is located on the website.

²⁰ <http://www.hi-beam.net/fw.html/>.

²¹ Chodorov explains his decision to exclude video in Pip Chodorov, <pip@re-voir.com>, "Re: video art & experimental film," 29 September 1998 and Pip Chodorov <frameworks@re-voir.com>, "Re: suggestions for Pip and others," 7 February 2004.

²² Specifically, many contributors felt that the theory and aesthetics of video should be included in the mission statement, but the list should prohibit technical questions about video making. See, for example, Fred Camper, <f@fredcamper.com>, "Re: suggestions for Pip and others," 6 February 2004; and Roger Beebe, <rogerbb@english.ufl.edu>, "Re: Video and FCP on Frameworks," 7 February 2004.

²³ Valerie Soe writes, "I'm amazed at how often this debate comes up on this list—it used to be every six months or so, but now it seems like every six weeks (or every six days). Maybe it's time to move on—," in Valerie Soe, <vsoe@sirius.com>, "Re: video art & experimental film," 29 September 1998. Sam Wells writes about "film vs. video round ten" in Sam Wells, <samw@voicenet.com>, "Re: Film and dv," 5 February 2002.

²⁴ Keith Sanborn, <mrzero@panix.com>, "DV Filmmaking," 24 October 1999.

²⁵ Sachs quoted in Flo Jacobs, et al., "Roundtable on Digital Experimental Cinema," *October* 137 (Summer 2011): 53.

²⁶ Brook Hinton, <brook@sirius.com>, "Re: video," 19 July 1996.

²⁷ Brook Hinton, <brook@sirius.com>, "The Video-to-Film Can of Worms (LONG MESSAGE)," 2 May 1998.

²⁸ Nathaniel Dorsky, "Nathaniel Dorsky explains why his 16mm films remain only on celluloid," *nathanieldorsky.net*, March 12, 2016, <http://nathanieldorsky.net/post/140901619953/nathaniel-dorsky-explains-why-his-16mm-films/>.

²⁹ Ibid.

³⁰ Scott Stark, <sstark@sirius.com>, "Re: video/film," 20 July 1996.

³¹ See Bordwell, *Pandora's Digital Box*, 62–85.

³² William Wees, <cyww@musica.mcgill.ca>, "Re[2]: The end of film?," 16 May 1997.

³³ Dominic Angerame, <danger@sj.bigger.net>, "Re: video to film transfers," 2 May 1998.

³⁴ Scott Stark, <sstark@sirius.com>, "Re: New York Film Festival Views from the Avant-Garde," 17 August 1998.

³⁵ Jeff Kreines, <jeffkreines@mindspring.com>, "Re: video to film transfers," 2 May 1998.

³⁶ Caspar Stracke, <stracke@yahoo.com>, "AVID II (Master of your own domain)," 26 August 1998.

³⁷ Jost's letter reprinted in Alfonso Alvarez, <melva@pacific.net.sg>, "Jost's letter," 27 October 1997.

³⁸ Alfonso Alvarez, <melva@pacific.net.sg>, "Jost's letter," 27 October 1997; Sam Wells, <samw@voicenet.com>, "Re: Jost's letter," 26 October 1997.

³⁹ Jon Jost, "End of the Indies: Death of the Sayles Men," *Film Comment* 25.1 (January–February 1989): 45.

⁴⁰ Scott Stark, <sstark@sirius.com>, "8 millimeters and 6 feet," 8 February 2000.

⁴¹ Scott Stark, <sstark@hi-beam.net>, "Re: brakhage and jost, film and dv, and jesus," 6 February 2002.

⁴² The origin of the phrase "hippy dippy breadmaking argument" is difficult to trace, but it becomes associated with Jost in 1998. See Tom Vick, <Tomvick785@aol.com>, "The Once And Future Can Of Worms," 3 May 1998.

⁴³ Robert Schaller, <Robert.Schaller@colorado.edu>, "Re: The Once And Future Can Of Worms," 3 May 1998.

⁴⁴ Jon Jost, <Verdejost@aol.com>, "Re: DV Filmmaking," 25 October 1999.

⁴⁵ See Bordwell, *Pandora's Digital Box*, 62–85.

⁴⁶ Fred Camper, <f@fredcamper.com>, “Re: Sunday Times, Brakhage DVD, & film’s future,” 24 August 2003.

⁴⁷ Jeff Kreines, <jeffkreines@mindspring.com>, “Re: Sunday Times, Brakhage DVD, & film’s future,” 24 August 2003.

⁴⁸ See Prince, *Digital Visual Effects*, 80–87.

⁴⁹ See, for instance, Julie Murray, <julifilm@verizon.net>, “audio in FCP question,” 2 January 2005.

⁵⁰ Bordwell, *Pandora’s Digital Box*, 153–173.

⁵¹ Gregg Biermann, <mubbazoo@optonline.net>, “Re: Digital Video and the Future of Canyon Cinema,” 23 August 2005.

⁵² Pip Chodorov, <frameworks@re-voir.com>, “why we shoot film (was: the word is out),” 5 February 2006.

⁵³ Sam Wells, <samw@voicenet.com>, “Re: film and dv, etc. [warning: long post],” 5 February 2002.

⁵⁴ Steve Polta, <stevepolta@yahoo.com>, “FUTURE OF FILM [was Letter to other Filmmaker Artists),” 21 July 2010.

⁵⁵ Nicky Hamlyn, <nicky.hamlyn@talktalk.net>, “Analog and digital,” 30 August 2011.

⁵⁶ Scott MacDonald, “Interview with Leighton Pierce,” in *A Critical Cinema 5: Interviews with Independent Filmmakers* (Berkeley, Los Angeles, and London: University of California Press, 2006), 258. For an overview of Pierce’s aesthetic concerns, see also Laura Coombs, “Fifty Feet of String: Interview with Leighton Pierce,” *Millennium Film Journal* 45–46 (Fall 2006): 63–64.

⁵⁷ All of this material is culled from MacDonald, “Interview with Leighton Pierce,” 271–272.

⁵⁸ Leighton Pierce, telephone conversation with the author, April 22, 2016. Unless stated otherwise, all of the details about the production of Pierce’s films stem from this conversation.

⁵⁹ See Scott MacDonald, *The Garden in the Machine: A Field Guide to Independent Films about Place* (Berkeley, Los Angeles, and London: University of California Press, 2001), 369–372.

⁶⁰ *Ibid.*, 367–368.

⁶¹ Leighton Pierce, telephone conversation with the author, April 22, 2016.

⁶² Pierce quoted in Scott MacDonald, “Interview with Leighton Pierce,” 274–275.

⁶³ Pierce outlines his basic method in Scott MacDonald, “Interview with Leighton Pierce,” 275–276. Additional information culled from Leighton Pierce, telephone conversation with the author, April 22, 2016.

⁶⁴ Leighton Pierce, telephone conversation with the author, April 22, 2016.

⁶⁵ Pierce quoted in Sharon Kennedy, “*Agency of Time: An Installation by Leighton Pierce*,” Sheldon Museum of Art Catalogues and Publications (Lincoln, NE: Sheldon Museum of Art, 2009), <http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1004&context=sheldonpubs/>.

⁶⁶ Pierce quoted in Scott MacDonald, “Interview with Leighton Pierce,” 267; and Laura Coombs, “Fifty Feet of String”: 66.

⁶⁷ Leighton Pierce, telephone conversation with the author, April 22, 2016.

⁶⁸ Pierce quoted in Laura Coombs, “Fifty Feet of String”: 69.

⁶⁹ Ibid.: 70.

⁷⁰ Leighton Pierce, telephone conversation with the author, April 22, 2016.

⁷¹ Pierce quoted in Laura Coombs, “Fifty Feet of String”: 72.

⁷² Ian Bogost nuances the view that video games are simply violent and unartistic in Bogost, *How to Do Things with Videogames* (Minneapolis and London: University of Minnesota Press, 2011).

⁷³ For histories of machinima, see Henry Lowood, “High-Performance Play: The Making of Machinima,” *Journal of Media Practice* 7.1 (2006): 25–42; Henry Lowood, “Found Technology: Players as Innovators in the Making of Machinima,” in *Digital Youth, Innovation, and the Unexpected*, ed. Tara McPherson (Cambridge and London: The MIT Press, 2008), 165–196; and Matt Kelland, “From Game Mod to Low-Budget Film: The Evolution of Machinima,” in *The Machinima Reader*, eds. Henry Lowood and Michael Nitsche (Cambridge and London: The MIT Press, 2011), 23–36.

⁷⁴ See Katie Salen and Eric Zimmerman, *Rules of Play: Game Design Fundamentals* (Cambridge, MA and London: The MIT Press, 2004), 304.

⁷⁵ Tanner Higgin, “Play-Fighting: Understanding Violence in the *Grand Theft Auto* Series,” in *The Meaning and Culture of Grand Theft Auto: Critical Essays*, ed. Nate Garrelts (Jefferson, N.C.: McFarland, 2006), 75.

⁷⁶ For instance, Peggy Ahwesh had never heard the word “machinima” when she made *She Puppet*, commonly cited as the first avant-garde video to be made from a game engine. Peggy Ahwesh, telephone conversation with the author, April 12, 2016.

⁷⁷ To be sure, there is an “experimental” tradition of machinima. Elijah Horwatt connects videos made by filmic avant-gardeists such as Peggy Ahwesh, Phil Solomon, and Eddo Stern with “outsider” and “political” machinima made by gamers, programmers, and other artists unaffiliated with the avant-garde. While this is primarily the tradition that I am speaking to, there are several “outsider” videos cited by Horwatt, including *Ozymandias* (Strange Films, 2000) and *My Trip to Liberty City* (Jim Munroe, 2004) that, at least in my formulation, are more invested in the tradition of machinima as such than its deployment within the avant-garde. See Horwatt, “New Media Resistance: Machinima and the Avant-Garde,” *Cineaction* 73–74 (2008): 8–14.

⁷⁸ Matt Kelland, Dave Morris, and Dave Lloyd, *Machinima: Making Animated Movies in 3D Virtual Environments* (Boston: Thomson Course Technology PTR, 2005), 50.

⁷⁹ Ibid., 80.

⁸⁰ Robert Jones, “Pink vs. Blue: The Emergence of Women in Machinima,” in *The Machinima Reader*, 277.

⁸¹ Ibid., 289.

⁸² Peggy Ahwesh, “*Lara Croft: Tomb Raider*,” *Film Comment* 37.4 (July–August 2001): 77.

⁸³ Peggy Ahwesh, telephone conversation with the author, April 12, 2016.

⁸⁴ Ahwesh, “*Lara Croft: Tomb Raider*”: 77.

⁸⁵ Peggy Ahwesh, telephone conversation with the author, April 12, 2016.

⁸⁶ William C. Wees, “Peggy’s Playhouse: Contesting the Modernist Paradigm,” in *Women’s Experimental Cinema: Critical Frameworks*, ed. Robin Blaetz (Durham: Duke University Press, 2007), 306.

⁸⁷ Ibid., 305–309.

⁸⁸ Ahwesh quoted in Scott MacDonald, “Interview with Peggy Ahwesh,” in *A Critical Cinema 5: Interviews with Independent Filmmakers*, 138.

⁸⁹ Of course, these camera movements are “impossible” in the sense that they could not be replicated by an actual camera in real diegetic space. Their impossibility is precisely the result of not being “camera” movements at all.

⁹⁰ See David Bordwell, *The Way Hollywood Tells It: Story and Style in Modern Movies* (Berkeley, Los Angeles, and London: University of California Press, 2006), 134–138.

⁹¹ Peggy Ahwesh, telephone conversation with the author, April 12, 2016.

⁹² When *Crossroad* premiered at the New York Film Festival's "Views from the Avant-Garde" in September 2005, it was called *Untitled (for David Gatten)* and is sometimes still referred to by that name.

⁹³ Sue Zemka, "An Interview with Philip Solomon," *English Language Notes* 46.1 (Spring/Summer 2008): 202.

⁹⁴ Ibid.

⁹⁵ While there have been many installments released in the series since 1997, *In Memoriam* is derived entirely from the fifth and sixth major iterations, *Grand Theft Auto: San Andreas* and *Grand Theft Auto IV*. *GTA: SA* was released for the PlayStation 2 videogame console by Rockstar Games.

⁹⁶ Solomon quoted in Zemka, "An Interview with Philip Solomon": 202.

⁹⁷ Michael Sicinski, "Phil Solomon Visits San Andreas and Escapes, Not Unscathed," *Cinema Scope* 30 (Spring 2007): unpaginated.

⁹⁸ Gregg Biermann and Sarah Markgraf, "Found Footage, On Location: Phil Solomon's *Last Days in a Lonely Place*," *Millennium Film Journal* 52 (Winter 2009): 32.

⁹⁹ Sicinski, "Phil Solomon Visits San Andreas": unpaginated.

¹⁰⁰ Biermann and Markgraf, "Found Footage, On Location": 32.

¹⁰¹ Solomon alludes to the importance of this technique when he jokes that he should be nominated for "Best Driver in an Animated Short Subject" in Zemka, "An Interview with Philip Solomon": 205.

¹⁰² Phil Solomon, e-mail conversation with the author, August 16, 2010.

¹⁰³ See Nate Garrelts, "An Introduction to *Grand Theft Auto* Studies," in *The Meaning and Culture of Grand Theft Auto*, 1–15.

¹⁰⁴ Solomon quoted in Zemka, "An Interview with Philip Solomon": 202.

¹⁰⁵ Ibid.

¹⁰⁶ Phil Solomon, e-mail conversation with the author, August 17, 2010. Note that this is an allusion to Mark LaPore's film *The Sleepers* (1989).

¹⁰⁷ See John Powers, "Glancing Outward: Towards the New Historicist Film," *Millennium Film Journal* 61 (Spring 2015): 75–82; and John Powers, "Glancing Outward: Notes on the New Historicist Film Parts III & IV," *Millennium Film Journal* 62 (October 2015): 58–67.

¹⁰⁸ Gatten quoted in Scott MacDonald, "Interview with David Gatten," in *Adventures of Perception: Cinema as Exploration: Essays/Interviews* (Berkeley, Los Angeles, and London: University of California Press, 2009), 303–304.

¹⁰⁹ For an extended discussion of this film, see Kenneth Eisenstein, "David Gatten's Handwood Process, I Mean *Hardwood Process*," *Journal of Film and Video* 54.1 (Spring 2002): 10–18.

¹¹⁰ Gatten discusses this technique in Holly Willis, "The Pleasure of the Text," *Film Comment* 49.2 (March/April 2013): 50.

¹¹¹ For more on this technique, see MacDonald, "Interview with David Gatten," 316–317.

¹¹² Gatten quoted in Willis, "The Pleasure of the Text": 51.

¹¹³ For a discussion of Gatten's *Continuous Quantities* and *Invisible Ink* series of films, see Genevieve Yue, "David Gatten's Sympathetic Ink," in *Texts of Light: A Mid-Career Retrospective of Fourteen Films by David Gatten*, ed. Chris Stults (Columbus, OH: Wexner Center for the Arts, 2011), 27–37.

¹¹⁴ Gatten quoted in Aaron Cutler, "The Secret of a Happy Home: David Gatten on *The Extravagant Shadows*," *Idiom*, April 26, 2013, <http://idiommag.com/2013/04/the-secret-of-a-happy-home-david-gatten-on-the-extravagant-shadows/>.

¹¹⁵ Gatten discusses his use of textual condensation in Cutler, "The Secrets of a Happy Home," and David Phelps, "Q&A: David Gatten," *desistfilm*, March 28, 2013, <http://desistfilm.com/qa-david-gatten/>.

¹¹⁶ Gatten quoted in Willis, "The Pleasure of the Text": 51.

¹¹⁷ Gatten discusses this aspect of the video in Cutler, "The Secret of a Happy Home," and Phelps, "Q&A: David Gatten."

¹¹⁸ See Cutler, "The Secret of a Happy Home."

¹¹⁹ Gatten quoted in Willis, "The Pleasure of the Text": 49–50. Gatten would repeat this line in introductions to most of his in-person screenings.

¹²⁰ *Ibid.*, 50.

¹²¹ David Gatten, e-mail message to the author, April 26, 2016.

¹²² Gatten quoted in Willis, "The Pleasure of the Text": 51.

¹²³ *Ibid.*

Conclusion

With the onset of digital video, the turn of the millennium witnessed the advent of an unlikely filmmaking subgenre: the avant-garde remake. Of course, remakes and reboots are par for the course in Hollywood, but they would seem anathema to the forward-minded avant-garde. In the 2010s, however, they seem to be proliferating. Ben Coonley's *Wavelength 3D* (2003) is a "video cover version" of Michael Snow's film, in which, as the title suggests, a zoom across a loft is outfitted with anaglyph 3D projection.¹ Bill Brown's *Kustom Kamera Kommandos* (2008) is a hilarious remake of Kenneth Anger's *Kustom Kar Kommandos* (1965) featuring leather jacketed boys caressing their Bolexes, while Eric Fleischauer's *Rhythmus 21st Century* (2011) uses sophisticated animation software to produce a frame accurate digital rendering of Hans Richter's *Rhythmus 21* (1921) in bright red and blue. *Ceibas: Epilogue—The Wall of Representation* (2011) hacks 16-bit video game technology to loosely adapt Hollis Frampton's *Gloria!* (1979), while Jen Proctor's *A Movie by Jen Proctor* (2010–12) and *Spline Describing a Phone* (2012) will immediately invoke shockwaves of recognition among those with even a causal interest in avant-garde cinema.

With the exception of Brown's film, all of these remakes are videos. In that sense, each addresses technology's influence on avant-garde filmmaking, as the original is recontextualized through the prism of digital media. Specifically, the videos confront the fact that different sets of technological, formal, and conceptual constraints produce very different films by suggesting processes that were unavailable at the time of the works' original incarnations. Of course, the concept of a remake also demonstrates an awareness of avant-garde film history and an interest in exploring the technological forces that have shaped that history. For instance, *A Movie by Jen Proctor* is a nearly shot-for-shot remake of Bruce Conner's *A Movie* (1958) using updated clips

of natural and manmade disasters culled from the Internet. Now that found footage is part of a database available to anyone with online access, how have the technological and cultural contexts of *A Movie* shifted? Are Conner's starving Africans and Hindenburg disasters today's YouTube stars and Hurricane Katrinas, and how has technology mediated our experiences of these events? As Proctor explains, "A lot of [avant-garde filmmakers] are looking back as a process of discovering how to make sense of what's come before in order to understand where we are now."²

Despite fears of demystifying avant-garde cinema or falling prey to technological determinism, the preceding chapters have argued that technology and technique are crucial for understanding avant-garde cinema's complicated relationships with aesthetics, theory, culture, and the act of art-making. Previous scholarship has emphasized the importance of mode-based and intermedial determinants, suggesting that subgeneric "schools," often incorporating influences from music, painting, and other arts, are the engines that drive avant-garde aesthetics. By illuminating the working processes of avant-garde filmmakers, I have argued that action-based responses to technological constraint directly inform mode-based and intermedial concerns and, more importantly, shape the viewer's experience of the films. Central to this argument has been the idea that avant-garde filmmakers innovate working methods to turn technological constraints into imaginative artistic possibilities. 16mm film was, on the one hand, a physical material, but it was also inaccessible in the camera, frustratingly linear, and subject to decay. Film stocks had unique exposure latitudes, grain structures, and color palettes that could not be duplicated from one stock to the next. The lab process, involving work printing and answer printing, exposure and color timing, and multiple-roll printing, was highly variable and often out of the filmmaker's control. Optical printing offered extraordinary possibilities for transforming

imagery, but it was predicated upon tedious, frame-by-frame labor. Digital was affordable and versatile, but it produced hyper-realistic, sterile images that lacked the organic sensuality of 16mm.

As I have demonstrated, filmmakers did not simply circumvent or “manage” these contingencies, but made them integral components of their approach to moving images. Peter Hutton and Nathaniel Dorsky worked with the specific qualities of film stocks to develop painterly aesthetics; more recently, Leighton Pierce has capitalized upon digital cameras and non-linear editing software to pursue his own vision of the “painterly.” Phil Solomon and Peggy Ahwesh realized that emulsion’s capacity for decay could be re-engineered for aesthetic and political purposes, but so could the immersive digital environments of contemporary video games. Stan Brakhage, Morgan Fisher, and J.J. Murphy devised procedures to welcome the film lab into the creative process. David Gatten seized digital’s potential for lengthy dissolves to extend his central filmmaking preoccupations across media. Luther Price and Barbara Hammer turned the filmstrip and optical printer, respectively, into extensions of their own bodies, fusing technology, aesthetics, and autobiography in service of an emphatically personal cinema.

In exploring the boundaries of a technologically delimited medium, avant-garde filmmakers innovated radical approaches to visual transformation, one of the defining characteristics of avant-garde cinema. This dissertation has suggested that some of this was generational, the result of the plurality of working methods shared by the “minor cinema” generation that followed Structural/Materialist filmmaking. Although it would be foolish to argue that one particular generation was responsible for such a widespread shift in orientation, it is clear that this era of avant-garde filmmaking cemented reworking and “post-production” as critical to the avant-garde project. In terms of technique, the immediate post-war avant-garde

epitomized by films like *At Land* (Maya Deren, 1944), *The Potted Psalm* (James Broughton and Sidney Peterson, 1946) and *Fireworks* (Kenneth Anger, 1947), emphasized in-camera transformation, surrealist mise-en-scène, and irrational motivation, relegating most of the “reworking” to the editing phase.

By contrast, this dissertation has provided dozens of examples of filmmakers taking cues from technological constraints to shift their working processes to retroactive manipulation. Phil Solomon submits fairly benign found footage to elaborate chemical treatments and transforms the results on an optical printer, rendering the originals as unrecognizable allegorical elegies. J.J. Murphy reprints his diary film until the image disappears completely, leaving only dots of emulsion grain in its place. Pat O’Neill builds a composite mise-en-scène from entirely separate filmic elements, adopting an approach to image making that suggests an unlikely synthesis of graphic design and automotive repair. David Gatten augments a more or less “real time” performance with the complete textual presentation of a dense short story, superimposed over his images in a gradual unfolding that takes hours to transpire. For these filmmakers, shooting film is the initial gathering of raw material, but the meaningful work of filmmaking is located in the processes that are then *applied* to this material.

Apart from the formal development of avant-garde cinema, technology also encourages film and media scholars to re-examine discourses of amateurism and medium specificity, both of which have been central to the avant-garde ethos. Specifically, this dissertation has confronted two commonplace assumptions: 1) The avant-garde’s authenticity is bound up with its lo-fi, amateur-based approach to filmmaking technology, often raw and occasionally crude; and 2) Technology in the avant-garde always functions reflexively, to call attention to the material and ideological dimensions of the medium. As we have seen, even “lo-fi” techniques, such as

throwing film stock into the ocean, wrapping the filmstrip in tape, and even playing video games, actually require a sophisticated understanding of the medium. On the other hand, Peter Hutton's skill as a cinematographer, Pat O'Neill's optical printing prowess, and Stan Brakhage's knowledge of the lab rivals any trained professional. Moreover, their uses of technology were contingent, historically situated practices that were not always reflexive examinations of the medium. While this was always an option—and often a very revealing one—technology served a wide variety of functions that were more diverse than anti-illusionism.

This dissertation has also broadened the “institutional turn” in recent avant-garde film scholarship by focusing on technology. Perhaps because the achievements of the cinematic avant-garde are so substantial in the face of indifference or outright hostility, there is a tendency to champion its autonomy by emphasizing its separation from mainstream industries. I have argued for a more complex view that understands the avant-garde to be both autonomous and dependent. As we have seen, the avant-garde piggybacked upon a variety of technological developments that were intended to service other filmmaking markets. Reversal film stocks were designed for amateurs and refined for the expediency of television news broadcasting. The lab business rose and fell according to the vicissitudes of commercial, industrial, and educational filmmaking. The avant-garde's notoriety for challenges to cultural norms regarding nudity and sexuality was facilitated by the labs' willingness (or unwillingness) to process pornography, resulting in blurred textual boundaries. Digital upended nearly every mode of moving image production, and the avant-garde was forced to adapt to developments about which it remained ambivalent. In the case of optical printing, the avant-garde appropriated a commercial technology, and the negotiations that resulted in low-budget optical printers like the JK shed

light upon the network of advanced amateurs, technological gurus, and machinists who committed themselves to film technology in the postwar period.

In this regard, this project is an attempt to salvage an important chapter of film history that threatens to be lost. Kodak currently produces a total of six camera stocks for 16mm. Film labs in the United States number in the single digits. Optical printing is the province of a small number of film schools that continue to teach it as part of the curriculum. Because the avant-garde has always been somewhat precarious, much of the documentation is lost to time. Meanwhile, the generation of filmmakers who made their most forceful contributions to the avant-garde in the last gasp of these technologies are entering the twilight of their careers. While conducting the research for this dissertation, it was common for filmmakers to say, “The details are hard to remember. This all happened 40 years ago.” As we enter a hybridized media landscape in which these technologies, processes, and filmmaking methods are recontextualized for new audiences, preserving this rich history becomes a crucial task. It defends the extraordinary legacy of the avant-garde and demonstrates the flexibility and robustness of the tradition as it absorbs new technologies and continues to innovate into the future.

Finally, this dissertation contributes to film and media studies more broadly by examining the complex technological negotiation that occurred outside of the studio system. Hollywood’s powerful regulatory agencies and strong emphasis on artistic norms create a set of parameters within which innovation is negotiated. As we have seen, the corporations that produce film stock, processing equipment, optical printers, and digital cameras are guided by ideological objectives that set limits upon artistic expression and, by extension, delineate the range of the permissible. The working processes of avant-garde filmmakers call attention to these limits. Their films and videos can be viewed as testaments to the power of imagination,

resourcefulness, and subversion. Although their work is often marginalized, the avant-garde reminds us that users of technology have the ability to resist, remake, and reorient the ideological imperatives of the dominant culture. The range, depth, and richness of their accomplishments confirms the value of this enterprise.

¹ Ben Coonley, program note for *Wavelength 3D*, Video Data Bank catalogue, <http://www.vdb.org/titles/wavelength-3d/>.

² Proctor quoted in Scott MacDonald, "Remaking a Found-Footage Film in a Digital Age: An Interview with Jennifer Proctor," *Millennium Film Journal* 57 (Spring 2013): 86.

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