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The Gap Between 1 and 0

Digital Video and the Omissions of Film History

Film history is a massive graveyard in which lost films are buried, never again to be recovered or seen. After a little more than 110 years of photographic moving images, the statistics of mortality are astounding. Of all films produced worldwide during the silent era before 1930, approximately ninety percent have been lost. In other words, we know about as much about silent cinema as we do about ancient Greek pottery. Virtually all local live television and national television from the medium's first twelve years is irretrievably lost. Of all films produced during the nitrate sound film era, i.e. between 1930 and 1955, only about fifty percent survive in any form. Not more than a couple hundred two-inch videotapes—the first and only commercial videotape format for more than ten years of early television broadcasting history—survive.[1] Independent film and video makers are notoriously unconcerned about their past work. Negatives are lost, and remaining distribution copies are routinely destroyed or worn out through continual use. How much of our collective moving image media culture continues to disappear from view and from consciousness with each passing day?

Even the images that have survived are not necessarily safe. Many films only exist in mutilated form or in foreign archives. Films made in certain widescreen formats or with now-obsolete sound systems or most color films from the last five decades are in grave danger. Unprotected nitrate films continue to decompose in the vaults, due to chemical instability and adverse climate conditions. Acetate films are subject to vinegar syndrome, another form of decomposition. Color films not based on imbibition color systems (e.g. Technicolor, where the negative is actually black and white) fade, so that eventually only a monochromatic magenta record remains. Sony 1/2-inch reel-to-reel video, an important format for "guerilla TV" in the 1970s, often only allows for a single pass in duplication before the metallic coating flakes off. There are at least thirty different analog video formats to worry about. However, moving image archivists have been slowly chipping away at these problems, preserving ever-greater numbers of films and videos. So where does one see the fruits of their labor?

We now live in a digital age, seemingly guaranteeing instant accessibility. Much of the general public in fact believes that every film and television program ever made has already been digitized and is now available in Netflix's catalog of 70,000 titles or clipped on YouTube (www.youtube.com), while total Internet access is just around the corner.[2] That is hardly the case because the near-term availability of historical films in digital formats is not necessarily the certainty many believe it to be. Indeed, while there have been great gains in the numbers of films that have been archivally preserved, restored, or reconstructed, it is also true that digital access to these new materials lags far behind preservation efforts. The reasons for this lag are complex and multi-layered,

involving both corporate policy and structural issues of evolving technologies, but this article argues that the public's access to classic moving image materials is in a severe crisis. If archives, other public institutions, and the corporate world don't meet the access expectations of the general public and their elected officials engendered by the Internet and other digital technologies, it will have a direct effect on public perception of the nation's archives,[3] influencing public support for preservation funding, and thereby ultimately determining survival rates of analog and digital moving image media.

No one can deny the fact that moving image technology has experienced a sea change in the last decade, a paradigm shift of massive proportions for production, distribution, exhibition, archiving, and access. The shift from analog to digital has been swift and deep, calling into question any and all public institutions, corporations, and individuals in the industry that do not transition to the non-material world of bytes and bits. The incredible, sudden death of emulsion-based amateur and professional photography and analog sound recording gave the signal; the obsolescence of motion picture film and analog video is a reality that will play itself out over a bit longer time period, possibly decades. The digital tidal wave is no longer stoppable, even though the technical, administrative, social, and political repercussions of steaming full speed ahead into an all-digital world have hardly been worked out, much less publicly discussed in any detail.

This is certainly true for the Internet, which in the utopian visions of America's remix culture remains a kind wild West, where any and all content is up for grabs—an unregulated "stupid" net, in the words of Joi Ito—while corporate web executives and government officials yearn for a "smart" net that will not only produce revenue but also be amendable to complete social control.[4] Whether the future will bring one kind of net or another is purely a matter of speculation, but it is almost certain that the world wide web and web 2.0 will become the dominant distribution mechanism for moving images, sound recordings, literary works, and documents. But what happens before we reach the point where download times are short enough for high definition feature-length digital films to be accessible via the Internet? And will all those analog films, videos, and television shows that have been produced by our culture during the last hundred-plus years actually be accessible?

Certainly, a point will be reached in the no-so-distant future when all surviving moving images will be digitized, wherein preservation will also constitute access, since a digital image is infinitely reproducible without image loss, unlike analog media. But what do we do in the meantime? The history of media transitions is not a happy one, given the extreme losses that have accompanied such paradigm shifts. All transitions are long and costly. At present, the primary complaint of studio technicians wishing to digitize in high resolution (now preferably 2 or 4K) is that original film elements are often in need of photochemical repair before they can be scanned. While the Hollywood film studios have been rapidly digitizing their moving image holdings, a minute amount of material in relation to the total holdings of public film archives has been digitized. The costs for digitization are still beyond the reach of most public film archives, limiting access to academic researchers on-site and public screenings.

For the great majority of potential consumers of moving image history, access is only possible through digitization, i.e. through DVDs (now) and the Internet (soon). DVDs have been with us a scant ten years, yet in that time they have almost completely supplanted VHS as a consumer format for renting and purchasing moving image material for private viewing in the home. Now these DVDs are rumored to be on the way out, as another generation of digital carriers (Blu-ray, HD-DVD, and mini-DVDs) has been introduced. Meanwhile, there hardly seems to be a dearth of initiatives to make high-resolution moving images as accessible on the Internet in the near future as digital music is today.

To assess the impact of DVD distribution on public access to classic moving images, I will discuss the actual availability in digital formats of two broad areas of moving image production: silent cinema and films named to the National Film Registry by the Librarian of Congress. The availability of DVDs for silent films and Registry titles illustrates the preservation/access status of works largely in the public domain, and therefore dependent on public funding for preservation

and digital access. Given the high-profile nature of the National Film Registry initiative and its commitment to increase public awareness of moving image history, digitization of Registry titles also has political implications directly affecting the cultural consensus surrounding moving image preservation, again impacting the survivability and dissemination of all moving images in our culture.

Moving Image Preservation: A Brief History

In order to examine the dynamic between digital access and moving image preservation, it is essential to contextualize the issues within film and video preservation work during the past thirty years. The project of moving image preservation and restoration is far from completed, since the great majority of moving images presently housed in public and private archives are not archivally secured, i.e. they survive as single copies that are at risk of damage if screened. Most archives now feature proper climate control for the long-term storage of such original master materials in order to maintain their longer-term safety before actual preservation commences. Still, it is estimated that in the United States alone nearly 80 million feet of nitrate film remain unprotected. When we scratch the surface of the acetate era, when we think about color preservation, or when we consider the many short-lived wide-screen formats of the 1950s, then the work of film preservation is not even close to completion, despite decades of efforts.

The realities of archiving have usually fallen short of the espoused ideal of preserving moving image materials in their original format. The fact is that obsolete technologies die quickly, and the expense of producing specialized materials is too high for either private individuals or public institutions to bear. The evolution of moving image technologies has almost always entailed migration of information from one format to another because it is no longer possible to preserve nitrate film on nitrate stock, nor 28mm or 22mm or 9.5mm acetate film in their original gauges. The same is true for Gaumont Chronochmes (a 1913 color process), Kodak's 16mm lenticular color, Technicolor inbibition print technology, Cinerama, Vistavision, four track magnetic stereo, hand-colored 35mm film prints, two inch quad master videotapes, Sony PortaPak video, Polavision, and Fisher-Price Pixelvision. Now digitality has made all analog material potentially obsolete and subject to migration from the physical to the virtual world.

However, for the last thirty-five years (and for at least a few more decades to come), public moving image archives and the assets archives of the major American studios have (and will) put their efforts into preservation of film on film, which remains more stable than any video or digital data format. Prior to the founding of the National Endowment for the Arts in 1965, film preservation was sporadic, unsystematic, and typically opportunistic in the light of private funding. The major archives, such as the George Eastman House, the Museum of Modern Art, the Library of Congress, and the National Archives (soon to be joined by UCLA Film & Television Archives), preserved individual nitrate films on a case-by-case basis, dependent on donations specifically earmarked for preservation. For example, a joint project of the Academy of Motion Picture Arts and Sciences and the Library of Congress in the early 1950s began the slow process of transferring the Library's paper print collection to 16mm.[5] At the same time, James Card, the founder of the George Eastman House film collection, procured funding from Eastman Kodak and the Ford Foundation to preserve a number of Mary Pickford titles.[6] Both efforts proved isolated and short-lived.

As Sarah Ziebell Mann notes in her essay on the evolution of American moving image preservation, "In the decade spanning 1967 to 1977, moving image preservation gained a national platform for the first time."[7] In June 1967, the National Endowment for the Arts created the American Film Institute with financial support from the Ford Foundation and the Motion Picture Association of America. Over the next ten years, the NEA granted a total of $3,777,092 through the American Film Institute to film archives for film preservation, or roughly $350,000 per year. Given laboratory costs at that time and the fact that grantees had to match funds on a one-to-one basis, approximately thirty to forty feature-length films could be preserved for this amount per year. According to one 1987 study, the four largest American archives alone held a total of 224,000

titles.[8] By the time the NEA terminated its film preservation program in 1994, more than $9.5 million had been granted to a variety of public film archives.[9] To put this figure into perspective, one might note that in 1988, the Turner Entertainment Company spent in excess of $400,000 to restore a single Technicolor feature, *Gone With the Wind* (1939). Steady inflation in laboratory costs has also taken its toll: the $355,000 awarded in 1992 allowed for the preservation of less than twenty-six titles.[10]

In the 1970s and early 1980s, the battle cry of film archivists was "Nitrate Won't Wait,"[11] but by the mid 1980s a new challenge arose with the identification of "vinegar syndrome" as a serious threat to acetate-based motion pictures. Semi-professional acetate formats, such as 16mm, were rarely considered candidates for preservation, even though the overwhelming majority of avant-garde films, documentaries, industrials, medical films, educational films, and other neglected genres were originally produced in that format. Furthermore, large numbers of 16mm films were held by numerous smaller and specialized archives, historical societies, and associations, whose primary mission was not film preservation and who had neither expertise nor funding for such activity.

Even before the defunding of the NEA's film preservation program, various efforts to insure the protection of this country's film patrimony had been instituted. The United States Congress passed the National Film Preservation Act of 1988 (Public Law 100-446), which established the National Film Board and the National Film Registry. In 1989, the Librarian of Congress began choosing twenty-five "culturally, historically or aesthetically significant films" per year as national treasures. When the National Film Preservation Act was reauthorized four years later, the Librarian of Congress, in conjunction with the National Film Preservation Board, was given a mandate to produce a study on the state of American film preservation, which was published a year later.[12] Taking the recommendations of that study into account, Congress in its 1996 reauthorization of the National Film Preservation Act created the National Film Preservation Foundation (NFPF) as a public and private partnership, initially funded by Congress, the Film Foundation,[13] and the Academy of Motion Picture Arts and Sciences.[14] The Foundation's mandate is the preservation and dissemination of so-called "orphan films," films whose copyrights has expired or have always been in the public domain. As of October 2006, the NFPF had funded the preservation of 1000 orphan films though grants to 152 different organizations.[15]

Meanwhile, although the Librarian of Congress commissioned another report on the state of television and video preservation, published in 1997, which recommended establishing a foundation similar to the NFPF for analog video preservation, neither Congress nor any other government agency followed through with funding proposals for the preservation of television and video.[16] The National Television and Video Preservation Foundation (NTVPF) was founded in 2003 as a purely private initiative, establishing an initial preservation grant program of $350,000 through in-kind services from various laboratories.[17] As of 2006, the NTVPF has funded thirty-three projects in as many institutions of video work originating almost exclusively in the non-commercial and independent sector.[18]

Ironically, in terms of volume, the major American entertainment conglomerates are now preserving more film than public archives. After literally neglecting their motion picture assets for more than six decades, e.g. by trashing nitrate originals in favor of inferior acetate copies, motion picture preservationists in the Hollywood industry have been busy at work in the last fifteen years in order to capitalize on their back catalogs through home video releases. The production of DVDs is driving analog film preservation and restoration. This apparent contradiction needs to be explained by differentiating various archival practices. First, there is the desire on the part of film rights holders to digitally re-master mostly canonical, historical films and television shows for commercial releases on DVD, HD cable/satellite television, and, potentially, the Internet. The corporate executives who control the transnational media conglomerates would like to believe that digitization is preservation. However, virtually all technical specialists, even those in corporate archives, agree that there exists at present no archivally viable digital preservation medium for long-term storage. Even digital information must

be preserved on film if the carrier is to last more than a decade or two. Analog film preservation of the original material must therefore precede digitization for access purposes, if the protection of assets is to be guaranteed. Complicating matters further, the restoration work necessary for digital access and analog preservation is now occurring simultaneously or consecutively. Indeed, digital tools today are a viable method of analog film restoration, meaning that master materials are digitized, then improved through digital image correction, enhancement, and reediting, before being burned with lasers back onto a film negative (or separation negatives for color).

A case in point: Studio negatives have often disappeared completely, as happened with both *Citizen Kane* (1941) and *Singin' in the Rain* (1951), thus forcing archivists to first complete an analog restoration from heterogeneous worn prints and foreign negatives before digitization. Restoration then continued with digital tools before generating new film negatives and digital records for access.[19] If films are to be preserved in their best possible state, high quality analog pre-print materials are needed, since the new high definition digital masters reproduce both a quality image and every technical imperfection in that image. As one studio technician noted in a recent email, "virtually all films, except the newest product need some kind of restoration." At Sony Pictures, according to Grover Crisp, one of the leading preservationists in the field, "We work on about 200-300 films per year. Out of a library of 4,000, since we began doing this in the early 1990s, we have improved or remastered 2,000 titles—and 1,000 of them have had full restorations."[20]

While digital tools are evolving at lighting speed, most are not yet sophisticated enough to supplant analog restoration/preservation. A significant amount of time (and expense) is spent in digital post-production, cleaning up the digital image because artifacts are not only reproduced from the analog master but also in the digitization process. File corruption is an unsolved problem mitigating against digital preservation, as demonstrated in the case of Disney's *Toy Story* (1996); when Pixar wanted to release *Toy Story* on DVD in 2000, technicians realized that more than ten percent of the 300 GB of storage files were corrupted or lost. Thus, given the lack of a long-term storage/preservation format for digital information, preservation can at the present time only be guaranteed by continuing to produce moving image master materials in analog formats. Indeed, as Barry C. Allen at Paramount's asset management facility confirmed, even the newest productions with heavy CGI components, like *Mission Impossible III* (2006), are preserved by out-putting color separation negative masters on 35mm film from the digital master edit.[21] Furthermore, even in the studios, no one has quite figured out how to manage high volumes of digital assets beyond putting hard drives with data on a shelf.

The incredibly rapid development of digital technology also forces asset managers to return repeatedly to the analog masters for new scans, each new generation of digital compression tools requiring the best possible analog pre-print materials. Beyond technical issues to those touching on globalization, American studios or their digital restoration partners are in late 2006 increasingly outsourcing much of the basic digitization work——cleaning up digital artifacts, etc. —to India, Korea, and China. While numerous technical decisions regarding image quality are made prior to digitization on the restored analog masters, outsourcing could possibly impact the quality of the ultimate preservation, since aesthetic and philological issues (which are culturally defined) as well as technical matters come into play in evaluating image quality and continuity in the restoration process. For the near-term future, then, analog restoration is still a reality for the public and private sector and may even remain a long-term preservation medium. Digitization for marketplace access, though, is the goal for the private sector, whereas the public sector lags far behind.

The Age of Digitality

We are presently rapidly moving away from a culture of objects to one of electronic bytes. Sometime in the next century—a mere moment in archival time—the very materiality of traditional media will become obsolete. Archivists are by nature conservatives—at least in the sphere of art, culture, and technology. This is because archivists have traditionally seen it as their job to conserve

cultural artifacts in their original states. While commercial enterprises are constantly improving technology in the interest of efficiency and cost in order to produce higher profits, public sector archivists are usually not governed by profit and loss but rather by the notion that moving image media have an intrinsic value, whether aesthetic or perceptual, apart from their informational content. As a result, moving image archivists and most public sector archival institutions are still dedicated to the notion of preserving film and video in its original materiality, as well as the experience of seeing such media in their original viewing mode. In order to preserve the experience of cinema for the public, most archives also program film in their theatres. Furthermore, scholars should still be able to access original film and video materials for research purposes. But mass media consumption on all fronts has gone digital. Mass distribution of film history to the general public and dedicated buffs will of necessity occur in the digital realm. And yet, as will be discussed below, digital access is far from guaranteed, even when a title has been added to the Library of Congress National Film Registry, as was Helen Levitt's *In the Street* (1948/52) last year. As the following email (written well before the film made the list) indicates, there is a degree of frustration among collectors and buffs, concerning the lack of access:

> Back in the forties, Helen Levitt and James Agee made a short documentary film called "In the Street" that captured life on the streets of Harlem at the time. Has anybody seen this film and can tell me where I might find it? … It looks like I can order it on the web, but the price is $50, for a film that's only 15 minutes. I'd rather rent or buy it cheaper if possible. Somebody who wrote the single review of it on www.IMDB.com said it was on a compilation that he bought on the grey market somewhere. Anybody know what that compilation was called? Thanks everybody. Oh yeah, if anybody's seen it, did you like it?[22]

More information is now being stored digitally than on all other surviving information carriers together, if we consider the fact that all government and private records are now computerized. The technologies of computer storage capacity are developing at a breath-taking speed. According to Jim Wheeler, a member of the archival standards committee for the hard disk drive manufacturers, we have entered the "brave new world" of digital storage. Hard disks now have the capacity to store one TeraByte of information.[23] Two hours of uncompressed PAL Video takes up about 310 GigaBytes,[24] and a two-hour high definition feature film requires one Terrabyte of storage space if it is uncompressed or between six and eighty gigs if it compressed. (One TeraByte is equal to 1000 GigaBytes, or a million MegaBytes.) Although all the printed material in the Library of Congress purportedly can now be placed on a single disk in your laptop computer as text transcriptions, even the newest HDD hard drives would not be able to store a significant number of films in their uncompressed state. Downloading an uncompressed feature film from the net would at present transfer rates take approximately 110 hours.[25] Some issues regarding download time are tied to capacities of the net, and maybe not so surprisingly, countries such as China, Japan, and India have constructed consumer broadband networks with far higher capacities than anything available in the United States.

The incredible growth of the Internet and the convergence of all media in digital form means that future public support in this country for the preservation and restoration of moving images will be tied to access in the digital realm. No public official, private foundation, or corporate entity can afford to fund analog film preservation without guaranteeing public access through digital media. Yet that is exactly what public archives aren't doing. While digitization of moving images is occurring at an extremely rapid rate in the private sector, digital restoration and access is for financial and technical reasons still not a viable option in public archives. Certainly, the costs for digitization have been decreasing and will continue to decrease, yet it is illusory to think that in the near future these costs will deflate enough to make digitization affordable to public archives. Technological advancement in digital tools, particularly in compression formats from MPEG-2 and MPEG-4 to Digiview C and AVC FG, alone, precludes significant cost

reductions, since new technologies must amortize themselves. While Warner Brothers may be able to pour millions into the restoration of some of its classic titles, including *The Wizard of Oz* (1939),[26] the major non-profit archives are years away from morphing into all-digital operations. Secondly, there is the issue of rights for copyrighted material and distribution costs for material in the public domain. While many rights holders themselves may be unwilling to foot the cost of digitization, they are more than willing to charge archives inflated prices for even non-exclusive distribution rights. This fact has seriously impacted access to moving image materials by the general public.

At present, consumers can digitally access motion pictures on demand in one of two ways, either through the Internet or through rental or purchase of DVDs. Other forms of access, such as cable television, are dependent on the programming schedules for channels such as Turner Classic Movies. Some moving images are accessible for streaming via the Internet but are not yet easily or legally downloadable the way that music is now available for purchase via your computer. For the present, though, only shorts are viable through Internet distribution, given download times. Furthermore, the industry is scared stiff of what Internet distribution of feature films may hold for them in the future, having just witnessed the demise of one of the country's largest music retailers, Tower Records, which has been attributed to the Napster debacle, iTunes, and other sources for music distribution on the Internet. However, some observers predict that feature films will be available in downloadable form in the very near future. For the present, the quality of the streaming videos on YouTube leaves much to be desired, due to high compression in the interest of speedy access, and will hardly satisfy consumers accustomed to seeing films in high definition on flat screen monitors. Certainly, the industry and its producers of big screen monitors are betting that consumers of moving images are interested in a constantly improved experience. At the same time, one can argue that today's youth, who have become accustomed to seeing low-resolution images on tiny screens, whether on iPods, hand-held video games, or laptops, may be indifferent to image quality and by extension the aesthetic experience.[27]

According to newspaper reports in late 2006, an independent Internet distribution company, ClickStar (a partnership between Intel and Revelations), is planning to make feature films available through broadband distribution. However, the project will only succeed if consumers can be prodded into buying new Media Center PCs with Intel's Viiv-brand chipset and software stack.[28] Simultaneously, Wal-Mart announced another scheme to begin testing a video download service on its website in 2007. The lack of specifics in regards to industry partners other than Hewlett-Packard who plan to supply the technology, however, makes this project dubious.[29] Given the industry's acknowledged resistance to broadband distribution of motion pictures, as well as competing technologies for broadband accessibility, it is unlikely that high quality net distribution of films will be available in the near term. As a result, DVDs are still the digital access medium of choice for the everyday consumer.

It therefore seems productive to take a look at just how accessible classic motion pictures are in DVD formats. Surprisingly, only a small percentage of works produced in the last 110 years are available in this digital format. While technical and financial issues impede availability in the public sector, marketing and legal costs hinder availability in the private sector. Many small distribution companies that used to feature extensive catalogues of classic titles in the lower cost analog video format VHS now find themselves unable to finance the production of new digital masters for the films previously in their catalogues.[30] The result is that both the quantity and quality of historical films available to consumers has been drastically reduced. The latest blockbusters and the most well-known classics on DVD are hawked by the major entertainment companies, who, of course, are only interested in generating substantial profits from titles with wide audience appeal and recognition. Other types of cinema have been forced into the margins of the market or eliminated altogether.

What remains is a reified Hollywood canon, which marginalizes box office failures, silent films, documentaries, independent films, politically hot topics, etc. For example, of the tens of thousands of feature films produced worldwide in the silent era, approximately ten percent survive in as films,

Mary Pickford in *Through the Back Door* (1921). Courtesy of the Milestone Collection.

but only a little more than 100 titles made between 1920 and 1928 were available on DVD in the winter 2002. Four years later, in October 2006, that figure had merely doubled to 205 titles:

1920	34 features
1921	18 features
1922	18 features
1923	15 features
1924	15 features
1925	33 features
1926	22 features
1927	28 features
1928	23 features[31]

Broken down by country of origin, we see that 133 titles or sixty-five percent are American, while foreign titles represent Germany (thirty-two titles/sixteen percent), the Soviet Union (thirteen titles/six percent), France (thirteen titles/six percent), and all other countries (fourteen titles/seven percent). Looking a bit closer at the American titles, their range is significantly reduced by the fact that no less than twenty-seven titles represent the efforts of only two rights holders: the Pickford/Fairbanks and Buster Keaton estates.

Many important films from the silent era remain unavailable, even when good analog master materials survive. Not a single silent film by King Vidor, John Ford, or Rex Ingram, three of the greatest American directors, has been released on DVD. While the works of male comedians Keaton, Chaplin, and Lloyd are well represented, with the exception of Mary Pickford, Hollywood's most popular silent actresses are virtually invisible, whether Pola Negri, Gloria Swanson, Colleen Moore, or Louise Brooks. Films from 1928 that were once released on VHS but have never become available on DVD include John Ford's *Four Sons*, Vidor's *The Crowd*, Joseph von Sternberg's *The Docks of New York* and *The Last Command*, Paul Fejos' *Lonesome*, Michael Curtiz's *Noah's Arc*, Joan Crawford's *Our Dancing Daughters*, Osa and Martin Johnson's *Simba*, and Erich von Stroheim's

The Wedding March, to say nothing of several Jean Renoir and Rene Clair foreign titles.

The interest of the private sector in film preservation and digital accessibility is tied crucially to the issue of rights. Since all films produced before 1926 are now in the public domain, commercial entities will not invest in silent films because they perceive little value in investing in the digitization of films for which they no longer own rights. As one executive emailed me, "it is virtually impossible to find funding for the production of DVDs from silent films, even if you had a film of Charles Chaplin dancing with Teddy Roosevelt."[32] Even if some companies are willing to invest in digitization for cable sales, they are often unwilling to carry the substantial publicity and marketing costs attached to a DVD release. How else can one explain the fact that the National Film Registry title *The Big Parade* (1925) is still not available on DVD, even though Time-Warner completed a high profile digital restoration more than two years ago?[33]

Furthermore, the transnational media corporations who control moving image media distribution worldwide are loathe to invest in the distribution of silent (or documentary, avant-garde, Third World, etc.) films because the perceived market of consumers interested in such films is too small, making amortization of digitization, production, and marketing costs uncertain, much less profitable in terms of millions of dollars. If commercial enterprises are unwilling to invest in the digitization of silent films, availability is dependent on a small number of under-capitalized specialty distributors, like Milestone, Kino, and Criterion, or on public archives and other non-profit entities. The Hollywood majors have in fact only exploited a small portion of their historical catalogues because projected income from historical, often black-and-white films would not significantly offset expenses for legal fees and marketing. Disappointing figures from the sale of VHS copies of classic titles, at least in relation to the millions earned from new titles, have not encouraged the industry to gamble on DVDs.

Louise Brooks in *Beggars of Life* (1928). Previously available on VHS, but not on DVD.

On the other hand, the major American studios have done a good job of putting National Film Registry titles out on DVD, but this may be saying more about the Librarian of Congress' exceedingly catholic tastes than it does about Hollywood. Originally, the National Registry was established to keep motion picture companies from releasing mutilated copies of films on video, either by panning and scanning or colorization, but that *raison d'etre* has seemingly fallen by the wayside. Since 1989, the Librarian has chosen twenty-five titles per year for a total to date of 450 titles, which through an Act of Congress are defined as "culturally, historically or aesthetically" significant motion pictures. According to a 2005 press release: "The list is designed to reflect the full breadth and diversity of America's film heritage, thus increasing public awareness of the richness of American cinema and the need for its preservation."[34] One might therefore assume that all films on the National Film Registry at the very least are available to the public in digital form. And, indeed, of the 450 Registry titles, 281 are Hollywood sound era studio features and shorts, of which 264 or ninety-four percent are available on DVD. Whether the majors see the National Registry as a good advertising tool or the Librarian of Congress has merely chosen the same films identified by the

industry as having a certifiable name recognition and potential audience is unclear. Spot checks of DVD advertising yielded few examples of Registry influence.

Of the remaining seventeen unavailable titles, including Elia Kazan's *Wild River* (1960) and *America, America* (1963), Robert Rossen's *The Hustler* (1961), and Budd Boetticher's *The Tall T* (1957), one can assume that either rights or technical issues are holding up their imminent release. In fact, *The Hustler* was released on DVD but is now out of print, a situation that is certainly endemic to new releases, when sales forecasts are not met, and may well impact future availability of classic titles. For example Alfred Hitchcock's *Notorious* has been released on DVD by different companies, but is again out of print. One short title, Dudley Murphy's *St. Louis Blues* (1929), is strictly speaking a studio title (RKO) and still under copyright but stars Bessie Smith in her only film role, making it an orphan of sorts.

However, the picture changes completely when looking at the "non-commercial product" on the National Film Registry. Of the remaining 169 Registry titles, consisting of studio produced silent films, government and independent documentaries, industrials, avant-garde films, independent films by ethnic minorities, and amateur films, only 94 titles or fifty-six percent are available, either on DVD or on the Internet. Ten titles are only accessible on the world wide web in low resolution, either from Rick Prelinger's Internet Archive, e.g. *Master Hands* (1936) and *The House in the Middle* (1954), or via YouTube and Google, including a possibly illegally uploaded copy of Robert Frank and Alfred Leslie's *Pull My Daisy* (1959) and the Native American film *Drums of Winter* (1988). No less than eighteen Registry titles are available on DVD thanks to the National Film Preservation Foundation's two DVD box sets, "Treasures from the American Film Archives" and "More Treasures From the American Film Archives." A third box set, "Treasures from the American Film Archives 3," is presently in production and should be available in Fall 2007. Were it not for the National Film Preservation Foundation's efforts, less than

Joseph Cornell's *Rose Hobart* (1936). Available on *Treasures From the American Archives* DVD.

half of all non-commercial titles on the Registry would be in digital distribution.

Unavailable to general audiences in any digital format are seventy-five silent films, documentaries, avant-garde films, and independent films by ethnic minorities, which together constitute a whopping eight-two percent of all Registry films that have not been digitized. Inaccessible silent films on the Registry include King Vidor's aforementioned *The Big Parade* and *The Crowd*, Thomas Ince's *Civilization* (1916), Joseph Loane *Tucker's Traffic in Souls* (1913), Joseph von Sternberg's *The Docks of New York* (1928) and *The Last Command* (1928), Ingram's *The Four Horseman of the Apocalypse* (1921), Erich von Stroheim's *Greed* (1924), Tom Mix's *Sky High* (1922), Victor Seastrom's *The Wind* (1928), and William Wellman's *Wings* (1927). Independent documentaries that have fallen out of distribution in the digital age include George Stoney's *All My Babies* (1953), Jill Godmilow's *Antonia: Portrait of a Woman* (1974), Frederick Wiseman's *High School* (1968) and *Hospital* (1970), Connie Field's *The Life and Times of Rosie the Riveter* (1983), and Saul Bass' *Why Man Creates* (1968). Even more shocking, given the National Film Registry's conscious attempt to resuscitate the memory of independent filmmaking by American ethnic minorities, is the lack of access to such African-American titles as Shirley Clarke's *The Cool World* (1963), Charles Burnett's *Killer of Sheep* (1977), the documentary, *King: A Filmed Record* (1970), Gordon Parks' *The Learning Tree* (1969), Helen Levitt's portrait of Spanish Harlem, *In the Street* (1948), the Mexican-American *The Pearl* (1948) and *Verbana Tagica* (1939), *Through Navajo Eyes* (1966), finally, *Topaz* (1943-45), shot by a Japanese amateur while incarcerated during World War II. Less surprising are the many avant-garde titles on the Registry that are unavailable in digital format, including Kenneth Anger's *Eaux d'Artifice* (1953), Bruce Baille's *Castro Street* (1966), Andy Warhol's *Empire* (1964), Jerome Hill's *Film Portrait* (1970), Jonas Mekas' *Reminiscences of a Journey to Lithuania* (1972), *Frank Film* (1973), Oskar Fischinger's *Motion Painting No. 1* (1947), Hollis Frampton's *Nostalgia* (1970), and Ernie Gehr's *Serene Velocity* (1970). In some cases, it may be the artists themselves or their estates who, for aesthetic reasons, have resisted making their films available in digital formats, but in other cases, the lack of capital has hindered wide distribution.

It would go beyond the scope of this article to demonstrate another reality, namely that the major American motion picture companies are releasing only a minute portion of their historical catalogs on DVD, especially black and white films. Suffice it to note that the thirty to seventy studio titles available for each year between 1930 and 1970 represent less than ten percent of all films produced per year by the Hollywood studios. According to several unanimous sources within the industry, there are no plans to release significantly larger numbers on DVD. Whether this changes in the future with digital access directly through the Internet remains to be seen. In other words, while digital technology offers the potential for far greater access to film history (certainly a technological possibility), the economic reality for the present and future is that the number of films available in the marketplace through digital technology continues to lag far behind actual holdings in the archive.

This limited access to our collective film history severely constricts the scope of what can be taught to students now that the majority of college faculty teach primarily from DVDs. Thus, the construction of film courses is increasingly limited to a canon according to the market logic of Blockbuster Video. How do you teach a course on silent cinema, on global cinema, on American independent documentary, or on avant-garde films from any period when virtually no one is at present willing to finance their digital distribution? Given these restrictions, students are confronted with a fragmented, incomplete, and distorted view of film history, based on what commercial distributors deem to be viable in the market place rather than what scholarship has ascertained as important. Will we raise a generation of docile moving image consumers, happily ingesting a steady diet of Hollywood's most contemporary entertainment?

Quite apart from these pedagogical implications, lack of digital access raises political issues regarding the future funding of the millions of feet of unprotected moving image material. In the short term, motion picture archivists and their funders must ask themselves serious questions about digital access. If they do not, the public that directly and indirectly funds film and television preservation will

rethink their own position. The gap between what has been promised in terms of "unlimited access" and the reality of digital access is bound to call into question funding priorities. Whether lower costs for digital technology will ultimately lead to a more democratic policy regarding our collective moving image archive is unclear. Unfortunately, the trend seems to be moving in the opposite direction, so that economics will continue to hinder progress. Unless archivists, academics, and cinephiles make a concerted political effort to increase public funding for digital access to non-commercial and public domain material, the archive of our collective visual past may indeed remain invisible to all but a handful of specialists. Our culture will be all the poorer for it.

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Notes

1. Jeff Martin, "The Dawn of Tape: Transmission Device as Preservation Medium," *The Moving Image* 5, no. 1 (Spring 2005): 45.

2. A recent discussion on the AMIA-List demonstrates this attitude. See Association of Moving Image Archivists listserv, http://palimpsest.stanford.edu/byform/mailing-lists/amia-l/2006/10/msg00406.html

3. This prognosis was formulated by Rick Prelinger, keynote presentation, "Remix or Rollover: Archival Paradoxes in Century 21," 4 November 2006, "TransFormations I: Remixing the Archive," University of Southern California.

4. Joi Ito, keynote presentation, "Empowering Remix Culture Through Copyright and Technology," 5 November 2006, "TransFormations I: Remixing the Archive," University of Southern California.

5. For a brief history of the Paper Print Collection, see Gabriel Paletz, "Archives and Archivists Remade: The Paper Print Collection and *The Film of Her*," *The Moving Image* 1, no. 1 (Spring 2001): 69.

6. See Christel Schmidt, "Preserving Pickford. The Mary Pickford Collection and the Library of Congress," *The Moving Image,* 3, no. 1 (Spring 2003): 64.

7. Sarah Ziebell Mann, "The Evolution of American Moving Image Preservation:Defining the Preservation Landscape (1967-1977)," *The Moving Image* 1, no. 2 (Fall 2001): 1.

8. Stephan Gong, "National Film and Video Storage: Survey Report and Results," *Film History* (1987): 128-9.

9. Figure quoted in Tom McGreevey and Joanna L. Yeck, *Our Movie Heritage* (New Brunswick, N.J.: Rutgers University Press, 1997), 74.

10. Annette Melville and Scott Simmon, Report of the Librarian of Congress, *Film Preservation 1993. A Study of the Current State of American Film Preservation* (Washington, DC: Library of Congress, 1993), 37.

11. See Anthony Slide, *Nitrate Won't Wait: Film Preservation in the United States,* (Jefferson, N.C.: McFarland, 1992).

12. See Melville and Simmon, 1993. As President of the Association of Moving Image Archivists (AMIA) and Senior Curator at George Eastman House, I testified at the hearings for that study.

13. The Film Foundation was established in 1990 by Martin Scorsese and other well-known Hollywood film directors as a funding organization for film preservation. See http://www.film-foundation.org/news/default.cfm

14. See National Film Preservation Foundation, *Report to the U.S. Congress for the Year Ending December 31, 2003* (San Francisco: NFPF, 2004), 2.

15. See National Film Preservation Foundation press release, 11 October 2006, http://www.filmpreservation.org/

16. See William Murphy, *Television and Video Preservation 1997: A Report on the Current State of American Television and Video Preservation* (Washington, DC: Library of Congress, 1997).

17. See press release, http://www.iptv.org/dtv/2003/media/ppt/Cont_29_9_Carter4.html

18. The list of projects and their preservation can be accessed at http://www.ntvpf.tv/html/works/works.html.

19. See Susan King, "Rescuing the classics: Computers do the nitty-gritty work," *The Los Angeles Times*, 26 November 2002, E6.

20. Quoted in Stephen Galloway, "Film Preservation," *The Hollywood Reporter*, 20 December 2005 (accessed online at hollywoodreporter.com).

21. Discussion with Barry C. Allen, Paramount Studios, 13 November 2006.

22. Erik Grow, email, Photo.net, http://photo.net/bboard/q-and-a-fetch-msg?msg_id=00BPtv&tag=, 8 March 2005, (accessed 4 January 2007).

23. In January 2007, Hitachi announced the introduction of a one terabyte hard disk, which will be available sometime in 2007 for $399. See Melissa J. Perenson, "Hitachi introduces 1-Terabyte Hard Drive," *PC World,* http://news.yahoo.com/s/pcworld/20070105/tc_pcworld/128400

24. Jim Wheeler, "Archives at a fork in the road take it!" [sic], AMIA-L@LSV.UKY.EDU, 30 November 2002.

25. Gibboney Huske and Rick Vallières, "Digital Cinema: Episode II," Report Credit Suisse/First Boston Equity Research, 4 June 2002, PDF File, 7-8.

26. Galloway, 2005.

27. I'm indebted to my editor, Lucas Hilderbrand, for this suggestion.

28. See "Intel Technology Lets Users Download Movies, Shows to View on TVs," *USA Today,* 16 November 2006, 5B.

29. Brad Stone, "Wal-Mart Plans to Test Online Films," *The New York Times*, 29 November 2006, C1.

30. One of the best of these is Milestone Film & Video, which has put out numerous interesting, non-mainstream films, including many silent films, rare documentaries, foreign titles, and experimental films. See http://www.milestonefilms.com/.

31. These figures were ascertained in November-December 2006 by checking several of the most readily available distributors of commercial DVDs, including Netflix, Facets, and Amazon.com. I have focused on silent feature films, since reliable figures on the availability of silent film shorts are much more difficult to come by. Another sixty-seven titles can be found in DVD for the years 1914 to 1919.

32. Edward Rasan, email to the author, 11 November 2006.

33. See Richard P. May, "Restoring *The Big Parade*," *The Moving Image* 5, no. 2 (Fall 2005): 140.

34. Library of Congress Press release concerning announcement of National Film Registry titles for 2005, 27 December, 2005, http://www.loc.gov/film/nfr2005.html (accessed 12 November 2006).