

Dusting Off that Old Projector: Preservation through Projection

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ABSTRACT

“Dusting Off that Old Projector: Preservation through Projection” makes the case that institutions that hold film prints and projectors—especially rarities, one-offs, and nonstandard gauges—should consider projecting films in an effort to preserve and perpetuate knowledge about the history of film technology. The authors use the success of Home Movie Day as a model for considering preservation through projection and to question absolutist protective strategies. Their aim is to expand the way that archivists, scholars, and the general public think about the significance of unusual film formats and equipment in relation to film history.

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KEY WORDS

Film archives, Film archiving, Film archivist, Preservation,
Film preservation, Film history, Film technology, Nontheatrical film,
Small-gauge film, Film projection

Film archives recognise that their primary commitment is to preserve the materials in their care, and—provided always that such activity will not compromise this commitment—to make them permanently available for research, study, and public screening.

International Federation of Film Archives (FIAP), Code of Ethics¹

What is the point of saving historical film equipment if nobody uses it? What should happen to the film meant to be projected using such equipment, especially irregular film gauges that were invented for exclusive use in a single machine? And what if the prevailing approach to the preservation of film via digital reformatting and print storage results in an almost complete loss of knowledge about how to use early film technology, especially unique formats, so that their demonstration eventually becomes impossible?

These questions need to be discussed and acted upon within the film archival community, whose role to protect and provide access to historical collections necessitates considering modes of use and engagement that are sometimes at odds with, or at least deviate from, prevailing preservation standards. In recent years, film archives and museums have rarely practiced the use of historical projection technology outside of 35mm and 16mm. This stands in contrast to the media archaeology community, which prioritizes the use of historical technology. Although focused on computing, Dr. Lori Emerson's Media Archaeology Lab at the University of Colorado at Boulder defines itself as "a place for hands-on, cross-disciplinary experimental research, teaching and artistic practice using a collection of thousands of still-functioning but obsolete tools, software, hardware, platforms from the late nineteenth century through the twenty first century." Emerson's lab considers a thorough understanding of the technology of the past as essential to understanding its present and future uses.² It was created as a reaction against "the tendency" to use "static exhibits that display the outside and surfaces of these artifacts rather than their unique, material, operational insides."

The Media Archaeology Lab functions as a form of resistance, "as a way to avoid reinstating a model of media history that tends toward narratives of progress and generally ignores neglected, failed, or dead media."³ In their writing about "hands on media history," John Ellis and Nick Hall make the point that "An encounter with the technologies of the past, once equally familiar but now fallen into disuse, will more readily reveal the double sided relationship between machines and people, bodies and tools, perceptions and potentials." Hands-on use rejects the erasure of technology "into black boxes or into the virtuality of data" by promoting the "physical exploration of objects liberated from their display cases."⁴

This compelling argument has not made much impact in the world of film archives, especially regarding idiosyncratic and small-gauge film, which is

our focus here. It has long been the understanding in the archival world that, as Paolo Cherchi Usai put it nearly thirty years ago, “a restoration is complete when the final result reflects what is to have been the original concept of the film.”⁵ This conception of film preservation privileges the content of a film, not its original format nor its exhibition mechanism. To preserve, restore, or reconstruct a film, the process of duplication is, of course, inevitable and useful. This once meant copying the film (often nitrate) over to safety film; today it usually means digitizing. Whatever the method, ensuring that the preserved work can reach the most people influences what format it is duplicated onto and therefore what the original or archival film material is transformed into.

Of course, preservation practices change over time and are subject to ongoing reconsideration. One of the first articles about film preservation published by Alex J. Philip in 1912 recommended keeping films in airtight containers; archivists now store films in vented containers.⁶ In the 1950s, British Film Institute (BFI) preservation officer Harold Brown built a film printer to convert many of the unusual early film formats in the BFI’s collection onto 35mm safety stock.⁷ Around the same time, the Library of Congress undertook a similar project with its extensive paper print collection, using a handmade printer with which Kemp Niver copied 35mm paper prints onto 16mm safety stock.⁸ Niver opted for 16mm film to ensure easy access because, at that time, 16mm was the most common format used to exhibit films at universities and film societies and by private film collectors. This practice of using whatever format is most convenient or accessible at the time of preservation is the norm. However, Paul Read and Mark-Paul Meyer’s 2000 book on film restoration argues the importance of “maintain[ing] as much as possible the original format of the film.”⁹ Consider this logic against Giovanna Fossatti’s argument nine years later that it is more important to maintain a film’s original look than its original format.¹⁰

While it is illogical and impractical to attempt to return everything to its original state, for example restoring older 35mm film back onto nitrate film stock, this article considers films that were released only on unusual formats such as 3, 17.5, or 28mm.¹¹ Modern principles of restoration erase precisely what is most special and interesting about these technologies. If archives holding such materials do not possess the means to create new preservation copies of films on nonstandard film stock, they typically do what they do for all film formats: digitize them for ease of access, focusing on the content and not the form. But, we argue here that they should also continue to exhibit the film on original equipment to counteract the erasure of the very aspects of cinema history they are attempting to preserve.

Preservation and Projection

In his discussions about the ontology of the moving image, philosopher Noel Carroll argues that “*Broken Blossoms* by D. W. Griffith—is not destroyed when any of the prints are destroyed, including the negative or master. Indeed, all the prints can be destroyed and the film will survive if a laser disk does, or if a collection of photos of all the frames does.”¹² This type of content-centric conceptualization was used in the 1999 government arbitration over the famous Abraham Zapruder home movie that captured the assassination of John F. Kennedy. As Sam Kula points out, government appraisers argued that “the value of the film lay in the images, not in the 6 foot strip of celluloid that the government seized in 1992.”¹³ Although the archival community has engaged in significant and long-standing conversations about “intrinsic value in archival material,” as the National Archives’ 1982 staff information paper refers to it, archivists still tend to privilege content over form.¹⁴ Most content-centric film preservation thinking seems to reinterpret or ignore protocols suggested in the 1980 UNESCO “Recommendation for the Safeguarding and Preservation of Moving Images,” which includes the following:

- c) maintain in good condition the equipment, some of which may no longer be in general use but which may be necessary for the reproduction and projection of material preserved or, should that not prove possible, ensure that the moving images concerned are transferred onto another material support permitting their reproduction and projection.¹⁵

This section can be interpreted in different ways. It could suggest that copies should be made of everything that can be projected in whatever fashion is most accessible. Or it could be taken to mean that archives should maintain equipment for the purpose of projecting nonstandard formats because their uniqueness is precisely the quality that makes them historically interesting.

Film preservation has been almost entirely focused on saving the content of film and not the means of making or projecting it. It is difficult to imagine those in the print library and archival professions adopting such a content-centric disposition toward first editions or manuscripts, not to mention art historians in relation to original works of art. Consider this logic applied to a Kindle version of H. G. Wells’s *The Time Machine* to argue that no resources are needed to save an 1895 copy of the book or the original manuscript submitted for publication because *it is really only the words that matter*.¹⁶ This attitude frequently prevails in relation to moving image archiving, and it impacts the way archives treat historical projection equipment by funneling resources primarily to the preservation of (largely theatrical) films, which have become the primary film historical artifacts that the general public experiences and that film scholars study. Although recent years have seen an increase in funding for and attention

to nontheatrical and small-gauge films, and certain archives (especially university or regional archives) tend to contain little if any 35mm film material, funds still disproportionately flow to theatrical film preservation with the outcome of digitization.

One recent example of film preservation bears consideration here. Vitaphone was a sound-on-disc technology introduced by Warner Bros. and Western Electric in 1926. The Vitaphone system used an amplified recorded disc system (not unlike a record player) that was synchronized (when it worked properly) to moving images projected utilizing the full 1.33:1 silent aspect ratio. In 1991, Ron Hutchinson began conducting a global search for early Vitaphone discs so that they could be reunited with their celluloid mates, which resulted in “the restoration of over 140 shorts, and over a dozen feature films.”¹⁷ This project accomplished the extraordinary task of bringing wedded Vitaphone sound and image content to new audiences. But, because audiences today rarely experience Vitaphone shorts as sound-on-disc projections, Vitaphone has been de-historicized by the restoration practice of removing the sound from the analogue disc and marrying it to the image digitized from the film material. The result is that not only does the sound get to the viewer differently, whether it is from a newly struck 35mm film print (which alters the image to the 1.37:1 sound aspect ratio) or Blu-Ray, but the Vitaphone system itself is marginalized, reduced to an abstraction. As wonderful as it is that Vitaphone sound and image content can reach an audience again, this is only part of what matters about the system. While it is, of course, preposterous to imagine trying to share Vitaphones with audiences *only* by using the original system, archives that hold original Vitaphone materials and the means to play and project them should consider doing so.

Wolfgang Ernst makes a related point in his discussion of media archaeology and sound. Discussing an approach to providing digital access to Albert Lord’s 1950s wire spool audio recording technology, he notes that “Most of Albert Lord’s wire spools have been transferred to tape. The wire recording device from the early 1950s in the collection is not functional anymore. In such migrations between hard and software, at any point cultural memory runs the risk of being interrupted.”¹⁸ As with the digitization of the Vitaphone shorts, access is greatly increased through content migration while knowledge is simultaneously lost. Discussing Edison’s wax cylinders, Ernst makes the point that “Digital memory ignores the aesthetic differences between audio and visual data and makes one interface (to human ears and eyes) emulate another.”¹⁹ One might argue also that the act of digital dissemination creates a complacency that risks permanently erasing our understanding of film’s technological past.

Using historical projectors to show old film is something of a lacuna in the field of moving image archiving outside of 35 and 16mm. Although largely

focused on digital access to historical film, in her book *Saving Cinema*, Caroline Frick claims that access is itself preservation.²⁰ Frick's argument, which was controversial in some circles at the time of her book's release in 2011, is pertinent to the case we make here about demonstration as a component of film preservation.²¹ Film archivists should learn how to use historical machines in their collections to demonstrate them to colleagues, scholars, and the general public. Film archives should encourage the use of their equipment with their film collections. Not unlike the digital preservation concept of "Lots of Copies Keep Stuff Safe" (LOCKSS), the concept of shared knowledge and resources for maintaining and using old projection equipment is relatively simple, but it requires a change of mindset about the appropriate uses of collections and necessitates that archivists invest in moving images beyond their content.

Archivist Snowden Becker argues that "projection of unpreserved materials risks violating a public trust."²² But, once an archives has digitally preserved a film, the benefit of projecting historical film significantly outweighs the risks—primarily of breakage or scratching—incurred through the act of projection. We encourage archivists to reconsider how they define preservation when it comes to historical film equipment and the films meant to be projected with this equipment. Protecting and saving is the central ethos of all archives. But, as the FIAF Code of Ethics suggests, artifacts that are saved should also be exhibited: "archives will seek to achieve the closest possible approximation to the original viewing experience."²³ Part of being able to research or study film history relies upon seeing historical film technology in action. This approach might be considered in the context of what UNESCO refers to as "intangible cultural heritage." Archives with relevant collections should reconsider the scope of uses that they allow with this in mind.²⁴

There is no doubt that the methods of preservation through use risk possible damage to unique or rare materials. But, with cautious, skilled use, these risks are worth taking given the benefits of knowledge creation and dissemination. Discussing evolving book preservation approaches in the 2000 *Handbook for Digital Projects*, Paul Conway acknowledges the methods of "Preservation OR Access," "Preservation AND Access," "Preservation IS Access," and "Preservation OF Access."²⁵ In the field of moving image archiving, this should include "Preservation AND Projection": preserving motion picture equipment with the aim of continuing to use it with film.

Use It or Lose It: The Case of Home Movies

Discussions of preservation through use rarely appear as central concerns in the film archival community except in relation to certain collection subsets such as home movies. Once widely produced by individuals in an array of

small-gauge formats, home movies documented families, communities, travels, local events, and, on occasion—as in the aforementioned case of the Zapruder footage of John F. Kennedy’s assassination—important historical moments. Snowden Becker, one of the founders of the Center for Home Movies, has advocated for “an approach [to dealing with home movies] that puts preservation and access on parallel tracks,” using the Home Movie Day model of “access-in-order-to-preserve” as a case in point.²⁶ In terms of building awareness about home movies and how they should be cared for, Home Movie Day is an international success story that relies upon the premise of using historical film equipment to project unique film prints. Started in 2002 by a group of moving image archivists concerned about people lacking access to their family histories by virtue of an inability to project them coupled with the threat that original film materials were being discarded after digitization, Home Movie Day created a context in which people could both see their home movies projected and learn how to take care of them.

These events rely upon volunteers who have access to the equipment (typically 16mm, 8mm, super8; more recently also including VHS) and who possess the ability to use it. Although Home Movie Day emphasizes access to content, historic projection equipment must be used to provide this access. [The Center for Home Movies](#) does not take a position on training individuals hosting Home Movie Days on how to use projectors; rather, it focuses on appreciation of and preservation of the original film materials.

Home Movie Day has significantly increased knowledge—both in the general public and in archives—about these materials, despite the calculated risks of possible damage during the act of projection at events. The event has saved many thousands of home movies from the dumpster and encouraged their preservation in both personal and institutional collections. As a result of the Center for Home Movies’ advocacy, home movies have been added to the Library of Congress’s National Film Registry, and “A growing number of local archives, museums, and historical societies are interested in collecting home movies of regular people—not just celebrities and major events.”²⁷ Projection has, in this case, directly led to preservation.

Home Movie Day is a testament to the efficacy of preserving—in this case unique, small-gauge—film through use. If home movies are treated *only* as inconsequential or, at the other extreme, *only* as precious artifacts, then they risk being unseen and lost. Of course, home movies were produced by the tens of thousands and were always intended to be projected by the individuals who produced them. But, because the knowledge of how to use a film projector is no longer widespread, the fate of home movies mirrors the larger dilemma confronting the archivist who lacks the technical know-how to work with analogue projection in any format, let alone the mechanical ability to work with a

technology that no living person has seen in action. While the solution to such lack of training is part of a much larger discussion, the Association of Moving Image Archivists' (AMIA) Small Gauge Amateur Film Committee regularly offers small format projection workshops at its annual conference to provide hands-on projection tutorials along with basic maintenance and repair skills. The equipment itself can last a long time with basic maintenance procedures like lubrication, skills that can be taught through workshops at national conventions and even through online resources.

What We Learn by Using Projectors

In the United States, significant motion picture projector and camera collections reside in both private and institutional hands, in archives, in libraries, and in museums. An informal survey of a few of these—including the George Eastman Museum, the Academy of Motion Pictures, the Smithsonian Institution, and the Museum of the Moving Image—suggests that some of the largest and most significant collections of historical motion picture equipment are rarely (if ever) used to demonstrate how such historical equipment works.²⁸ The George Eastman Museum appears to be the most active in this area. It occasionally runs projectors for visitors, including its hand-cranked Lubin and Lumière cameras (using LED bulbs as a safe light source). The museum also puts on historic process workshops in which participants make, perforate, and shoot 35mm film (usually using a Bell and Howell Eyemo), which is processed and projected as part of the experience.²⁹ However, most institutions exhibit cameras or projectors for the public in vitrines, if at all. They become unmoving objects meant to be looked at, but not seen in action.

Referring to Don Malkames's collection of over a hundred historic projectors, in 1957 Bernard Plakun recalled the "memorable experience" of getting to "see and handle the material on the shelves, and to hear Malkames glowingly describe the place that each piece occupied in the history of motion pictures."³⁰ Such hands-on, anecdotal knowledge has played an essential role in preserving film history. Malkames produced his own 35mm films describing and demonstrating the equipment in his collection, which were shown at Society for Motion Picture and Television Engineers (SMPTE) conferences in the late 1950s. However, these films—*The History and Development of the 35mm Projector* and *The Motion Picture Camera*—focus exclusively on 35mm technology.³¹

The George Eastman Museum, the American Society of Cinematographers Museum, the Academy of Motion Pictures Film Archive, and the University of Southern California's (USC) Hugh M. Hefner Moving Image Archive each have significant historic motion picture camera collections. USC's collection was built over the years by Herbert E. Farmer, who began preserving motion picture

technology in the 1930s. Farmer advocated for using the technology in USC's collection instead of restricting it to storage, which often came in handy as USC had very little equipment in the 1930s and 1940s and so maintaining older film equipment was necessary for the school to produce and exhibit new films. For example, Farmer used early 35mm suitcase projectors such as the Simplex and DeVry types to project films; he even modified silent machines from the teens and twenties, like the Powers #6, by adding a motor drive and sound head.

Having already positioned our intervention in archival discussions about preservation and access in relation to the home movie, it is fitting to turn to early small-gauge formats as examples of how handling and use can generate knowledge about film history. Building on the ethos of Farmer's practical tinkering and use, what follows explores two historical formats that Dino Everett has repaired, tweaked, and publicly demonstrated: the 17.5mm Ikonograph film projection system from 1907, which might have become the first American home movie system had the enterprise not failed in its third year of business; and Thomas Edison's Home Kinetoscope from 1912, another failed attempt to enter the home market. Both of these were intended for lay use. In addition to handling the machines and projecting original films using them, Everett has also digitized films for preservation and access purposes. Through the process of activating equipment that would otherwise be sitting on shelves in storage and by projecting original film in formats largely forgotten and almost never exhibited today, we are intentionally disrupting the practice of protecting historical film equipment and (in this case, idiosyncratic) film materials by not using them. The prevailing practice perpetuates a kind of technological amnesia that will only accelerate in the digital age as fewer archivists are trained in analogue technologies of projection (and camera operation).

THE IKONOGRAPH

Although neither the first nor the only, the 1907 Ikonograph projector is an early device produced for home exhibition. It used 17.5mm nitrate film, a mere 1.5mm different from what would become the standard 16mm home and nontheatrical movie film gauge produced largely on acetate stock starting in 1923.³² The reason for the fairly widespread use of the 17.5mm gauge is intuitive: it is easy to split unperforated 35mm, thereby making 17.5mm a more affordable alternative by half. The location and nature of the perforations, with analogous modifications to the projecting equipment, are the key variables between different versions of 17.5mm film, several of which predated the Ikonograph.

The New York City-based Ikonograph Company was incorporated in 1907 with credit for the device's invention given to Enoch Jay Rector.³³ Rector had worked on several other professional motion picture cameras and



FIGURE 1. Examples of 17.5mm film from the USC Hugh M. Hefner Moving Image Archive. From left to right: *Ernemann Kino* (1903), *Ikonograph* (1907), and *Biokam* (1899). Photograph by Dino Everett, USC.

projectors, including with W. K. L. Dickson in Thomas Edison's laboratory on the Kinetograph, Edison Company's first motion picture camera.³⁴ In 1902, Rector patented the Vitak system, which used 11mm wide film and, as historian Alan Katelle points out, "is believed to be the first US made projector using non-standard film designed specifically for amateur use."³⁵ The Vitak system strongly resembled what was to become the Ikonograph system.

In July 1907, a *Talking Machine World* advertisement optimistically declared the Ikonograph to be "a perfect moving picture machine."³⁶ Just three years later, the *New York Times* published bankruptcy notices for the company, followed shortly by notice of a sale of its assets.³⁷ The rapid failure of the Ikonograph system rested partly on confusion about its applications. Several



FIGURE 2. Ikonograph Company of American incorporation notice, *New York Times*, February 1907

THE PROBLEM SOLVED AT LAST!
A PERFECT MOVING PICTURE MACHINE FOR THE HOME

AN INSTANTANEOUS SUCCESS



The IKONOGRAPH

It can be operated by a child.
 The IKONOGRAPH is to the eye what the talking machine is to the ear. **It is not a toy**, but a practical machine, giving results in every way comparable with those of any high priced moving picture machine.

You Sell Phonographs, Why Not Moving Picture Machines?
Of Highest Educational Value, and In Demand for Church, Sunday School, Lodge and Home Entertainments.

Write for Pamphlet **Retail Price, \$40.00**

IKONOGRAPH COMMERCIAL CO. **36 East 23d Street**
NEW YORK

FIGURE 3. The first Ikonograph advertisement to appear in *The Talking Machine World*, June 15, 1907

advertisements, for example, caution consumers that the Ikonograph is not a toy, a magic lantern, or a stereopticon machine, suggesting a misperception deriving from its initial marketing.³⁸ Its biggest downfall, however, was the scant availability of films. Because buyers could not project non-Ikonograph 17.5mm films due to the system's proprietary perforations, and also given the relatively short runtime of the limited number of films available, this lack of content would have been frustrating for early adopters. One advertisement mentions that manufacturers "propose to get out from fifteen to twenty-five new subjects each month," comparing this mode of distribution to the way that consumers acquired new records for their phonographs. But the technologies were not really comparable in this way, and an exchange program—much like the initial Netflix DVD-through-the-mail program—would have been both cumbersome and costly in 1908.

USC's archives has two different Ikonograph projectors. The first is the Model B, which came mounted on a board along with a lamphouse.³⁹ The board is designed with a small cutout to let the film fall through once it runs through the gate, so the operator must lean the projector forward, creating unavoidable instability, which we only learned as Everett first projected a reel. The film roll was originally held up by a small metal rod, but these are missing from almost all surviving examples, indicating that this piece likely broke off—another probable source of user frustration. The slot in the board did allow the operator to drape the smaller five- and ten-foot circular rolls to allow for continuous, repeat

projection. Another unique aspect of the projector, which advertisements never mention and is only discoverable through use, is that because the film is driven solely by a claw, it is just as easy to project in reverse as it is forward.⁴⁰ For short subjects, which the Ikonograph offered almost exclusively, making a dog run and jump in reverse, or a fire truck run backward, allowed actuality footage to be enlivened or even made humorous, a selling point on which the company did not capitalize.

THE TALKING MACHINE WORLD. 13

Easy Dollars for You Mr. Talking Machine Dealer

THE BEST SIDE LINE YOU CAN CARRY. INVESTIGATE NOW AND INCREASE YOUR PROFIT EARNING CAPACITY

YOU are looking for the most attractive side line to handle in connection with talking machines. Something which will draw business to your establishment and coin you dollars. Here it is, THE IKONOGRAPH, a genuine moving picture machine for the home, not a toy, but a regular moving picture machine that can be operated by anyone, anywhere, at any time, on the same plan, and just as satisfactorily as professional machines costing hundreds of dollars. There is absolutely nothing like it on the market, and the agency for the IKONOGRAPH is worth a good deal to any business establishment.

The illustrations shown on this page will give you a comprehensive idea of some of the various models which we offer.

The IKONOGRAPH is a moving picture machine for the home, but it should not be confused with magic lanterns or stereopticons. Intelligent and constant effort has been concentrated on this product and as a result the new 1908 IKONOGRAPH models are put up to the highest point of mechanical utility. The IKONOGRAPH can be successfully used in the home, lodge room, class room or for any form of private or semi-public entertainment. The mechanism is extremely simple. It is easily managed and is absolutely safe, fool proof and fireproof. The IKONOGRAPH is readily operated by the most inexperienced, and the results produced by it are amazing.

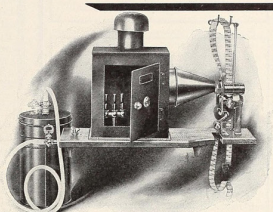
The IKONOGRAPH fills the position of a splendid entertainer and for a real moving picture machine is sold at a surprisingly low figure when the remarkable work it does is considered.

Picture films for the IKONOGRAPH are supplied in lengths ranging from ten to one hundred feet. Nearly one hundred subjects are now ready. New ones are being added every month.

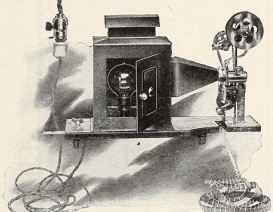
Look over these illustrations and write to us for a booklet. We know the perfection of the IKONOGRAPH of to-day and realize full well the opportunities which the talking machine dealer has in offering this marvelous product in conjunction with his regular line. Do not overlook the marvelous business possibilities which this product has for you. Don't write soon, but NOW.

SOLE SALES AGENT

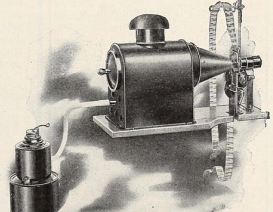
The JOHN NEWTON PORTER CO.
253 BROADWAY, NEW YORK



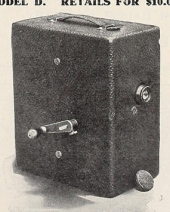
MODEL C. RETAILS FOR \$15.00



MODEL B. RETAILS FOR \$25.00



MODEL D. RETAILS FOR \$10.00



IKONOGRAPH MOVING PICTURE CAMERA

FIGURE 4. Ikonograph advertisement, *The Talking Machine World*, July 15, 1907

The second example in the USC archives is the later Model D. This model seems more robust in construction than the Model B, though it is not as gentle on film. This might not have mattered as much in 1907, but, more than a century later, it makes all the difference in the world. The claw operates through a combination of the gear turned by the hand crank, which is tied to a beater movement that in turn pushes a third eight-pin gear to operate as the claw. There is no fire shutter on the example held at USC, which would have protected the flammable nitrate film from a light source likely to ignite it if the film stood in place for long. While the mechanism on the Model B is under the film gate, the one on the Model D is behind the gate, which pivots out to facilitate threading. This increased distance from the heat of the lamp perhaps negated the need for the fire shutter.

Compared to many of the other early amateur projectors held at USC, the Model B appears to be one of the best hand-cranked projectors ever produced. Much of its technical achievement has to do with its simplicity, which was also a limitation as the projector could only handle very small rolls of film; if the projector had to pull hard enough to rotate a larger, heavier reel, it would have easily damaged the film. The Ikonograph projector was therefore really only suited to handle very short films and would not have been a good candidate for showing longer movies. Because all Ikonograph projectors are claw driven, neither model could have easily pulled even the 69- or 150-foot films that the company advertised, at least not without damaging them and quickly rendering them unprojectable.

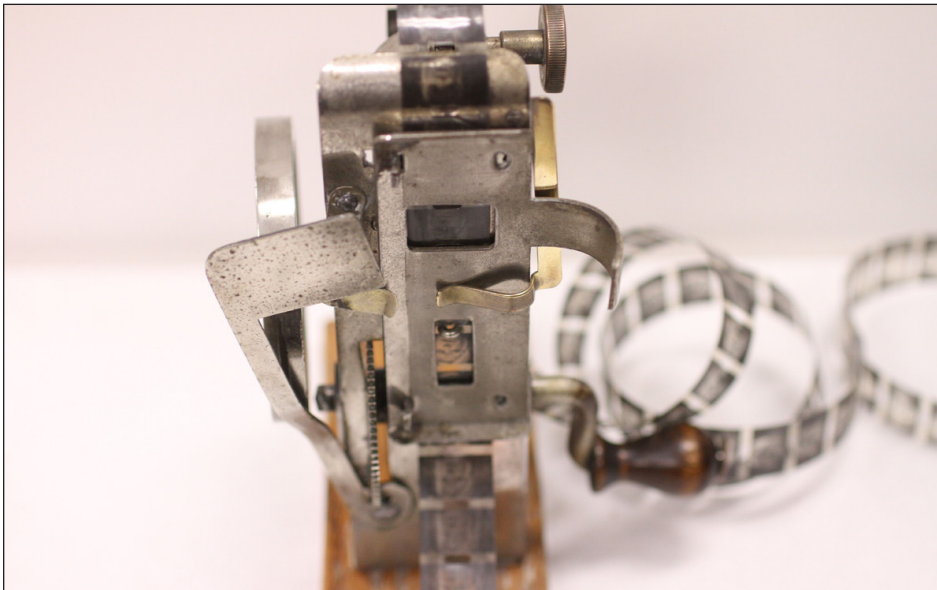


FIGURE 5. The diminutive Ikonograph projector Model B, mounted on a board, with 17.5mm film. Photograph by Dino Everett, USC.

In July 1907, Ikonograph boasted having thirty available films, ranging from 10 to 69 feet in length—with only one film in the longer category.⁴¹ A 10-foot film would have lasted anywhere from ten to twenty seconds depending on the rate of crank, so these offerings are truly short for 1907 audiences, who had experienced films of durations well beyond the twenty-second novelty phase of American cinema's first years in the 1890s.⁴² The titles listed in their advertisements were also throwbacks: "Reading a Letter," "Cake Walk," "Baby's Bath," and "Water Fall" suggest the short skits and spectacle films typical of the 1890s. For this reason, they do not seem like purpose-made films but rather recycled films, likely taken from other producers well after their original commercial lifespan, a common practice of the period before films had copyright protections.

By offering short films on a loop, the projectionist would not have had to worry about any sort of take up or rethreading and instead could keep cranking the film until the short comic gag or spectacle wore off. After using the Ikonograph, it is hard to imagine what 150 feet of film piled up on the floor below might have looked like. Even the earliest models of professional 35mm projectors that dropped projected film into baskets had a maximum roll of roughly 50 feet, another indication of the engineering limits of this system.

Although we have not been able to track down a complete Ikonograph film catalog, if one ever existed, we are aware of a handful of Ikonograph films in American film archives, so the films themselves are truly rare. This raises a secondary but important issue with nonstandard film material, which often get misidentified by archives,

IKONOGRAPHS IN DEMAND.

Leading Talking Machine Jobbers Take the Agency for This Moving Picture Machine— Their August List of Films.

The Ikonograph Commercial Co. have made wonderful progress during the past month, and have annexed many of the largest jobbers in the country, who will handle their machines on a jobbing basis. This company are doing business on the same plan as the large talking machine manufacturers, namely, selling only through jobbers, and standing firm on price regulation. One decision reached deserves especial notice. They will not sell to department stores. This will protect the small "talker" man and give him a better opportunity to make good. They will issue monthly lists of films. For instance, the subjects for August are as follows:

	Length.	Price.
1. The Funny Story.....	20 ft.	\$1.50
2. Skating	20 "	2.00
3. The Dude and the Mine Explosion	38 "	3.50
4. Lady Acrobats	26 "	2.50
5. What the Blind Man Saw.....	15 "	1.50
6. Thick Elephant.....	15 "	1.50
7. Shooting the Chutes.....	20 "	2.00
8. French Dancing Girls.....	20 "	2.00
9. The Lung Test.....	25 "	2.50
10. Breaking Up Housekeeping	25 "	2.50
11. Professor Nillem	32 "	3.00
12. Reading a Letter	20 "	2.00
13. Herald Square	18 "	2.00
14. Boot Black	30 "	3.00
15. The Human Trolley.....	16 "	1.50
16. Parktown Cafe	37 "	3.50
17. Washington Flyer	20 "	2.00
18. Coon Klosses	15 "	1.50
19. Grand Entree of Barnum & Bailey's Circus.....	69 "	7.00
20. Cake Walk	15 "	1.50
21. Street Circus Parade	30 "	3.00
22. 5th Ave. 42d St., New York.....	15 "	1.50
23. Baby's Bath	41 "	4.00
24. A Policeman and the Cook.....	30 "	3.00
25. Scenic Railway	23 "	2.25
26. Miniature Railway	10 "	1.00
27. Water Fall.....	10 "	1.00
28. Coast Scene	26 "	2.50
29. Clown's Head.....	15 "	1.50
30. Conversation, Two Circus Clowns	20 "	2.00

FIGURE 6. The first time *The Talking Machine World* listed a substantial body of Ikonograph films was in the July 15, 1907, issue.



FIGURE 7. The original red can containing a 10-foot Ikonograph film, *The Magic Face*. Photograph by Dino Everett, USC.

left out of catalogs, or placed into an “unidentified” category. 16mm is always 16mm; but 17.5mm existed in many different iterations and was produced by numerous companies. In terms of the Ikonograph films in collections that we are aware of, Northeast Historic Films has Ikonograph #78, *The Tramp’s Bath* (40 feet) and USC has five Ikonograph films, which Everett digitized before projecting: #32, *Disappearing Tramp*; #72, *The Magic Face*; #101, *New York Fire Scene*; #133, *A Quick Shave*; and #138, *The Faithful Friend*.⁴³

When we projected a selection of Ikonograph films at the Association of Moving Image Archivists conference in 2018, the design of the separate lamphouse made it easy to switch over to a safe modern light source, which is necessary as the Ikonograph films are nitrate. For the light source, Everett used an old Kodaslide Highlux III slide projector, which has a built-in fan cooling system to ensure that the light never got hot enough to cause damage. With this setup, the overall quality of the projected image was surprisingly good. In addition to the modified light source, Everett used a lens from a Bell and Howell 16mm projector because we knew that we could not darken the hotel conference room enough, necessitating increased brightness from the projector. In 1907, the image would have been smaller and dimmer, not unlike other early home projectors; this would have been compounded by the poor print quality of Ikonograph films. In 1907, *The Talking Machine World* declared that the Ikonograph had as “clear image quality” as “the most expensive machines,” with “no flickering.”⁴⁴ By replicating exhibition with original film in an original projector, even with modifications, we now know that this was wishful promotion.


In his oral history, Alan Katelle deems the Ikonograph “one of the better amateur motion picture projectors for that era,” possessing a “nicely built lamp house with a chimney.”⁴⁵ Though the Ikonograph failed in the marketplace, it is an important, transitional piece of projection equipment. Preserving the films distributed for use in the Ikonograph is of little value when compared to experiencing the equipment itself. Despite what seems like an especially convenient size, for example (the projector is around eight inches high and six inches long), if the operator uses one hand to crank the film and the other to focus the lens it becomes extremely easy to bounce the projector, causing the image on the screen to be unsteady on top of already mediocre image quality. Most hand-cranked projectors were much heavier, making them less portable but correcting this wobble problem. These kinds of observations can be discerned only through use.

EDISON’S HOME KINETOSCOPE


The Ikonograph company is one of the many hundreds of failed film pioneer enterprises. Thomas Edison’s company, on the other hand, was successful

<p>BABY ARC LIGHTING EQUIPMENT FOR ALTERNATING CURRENT (110 volts—60 cycles, including Transformer)</p> <p>Machine complete with "A" Lens System, \$83.00 " " " " "AA" " " " 86.00 " " " " "B" " " " 86.00 " " " " "C" " " " 88.00</p>																														
<p>BABY ARC LIGHTING EQUIPMENT FOR ALTERNATING CURRENT (220 volts—60 cycles, including Transformer)</p> <p>Machine complete with "A" Lens System, \$85.00 " " " " "AA" " " " 88.00 " " " " "B" " " " 88.00 " " " " "C" " " " 90.00</p>																														
<p>SIZE OF PICTURE ON SCREEN WHEN ACETYLENE BURNER IS USED</p> <table border="1"> <tr> <td>At</td> <td>10 Ft.</td> <td>15 Ft.</td> <td>20 Ft.</td> <td>25 Ft.</td> <td>30 Ft.</td> </tr> <tr> <td>Lens A</td> <td>12"x16"</td> <td>18"x24"</td> <td>24"x32"</td> <td></td> <td></td> </tr> <tr> <td>" B</td> <td>18"x24"</td> <td>27"x36"</td> <td></td> <td></td> <td></td> </tr> <tr> <td>" C</td> <td>24"x32"</td> <td></td> <td></td> <td></td> <td></td> </tr> </table>				At	10 Ft.	15 Ft.	20 Ft.	25 Ft.	30 Ft.	Lens A	12"x16"	18"x24"	24"x32"			" B	18"x24"	27"x36"				" C	24"x32"							
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<p>Edison Films</p> <table border="1"> <thead> <tr> <th>CLASS</th> <th>PRICE OF FILM</th> <th>EXCHANGE FEE</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>\$2.50</td> <td>\$.30</td> </tr> <tr> <td>B</td> <td>5.00</td> <td>.40</td> </tr> <tr> <td>C</td> <td>7.50</td> <td>.50</td> </tr> <tr> <td>D</td> <td>10.00</td> <td>.60</td> </tr> <tr> <td>E</td> <td>12.50</td> <td>.70</td> </tr> <tr> <td>F</td> <td>15.00</td> <td>.80</td> </tr> <tr> <td>G</td> <td>17.50</td> <td>.90</td> </tr> <tr> <td>H</td> <td>20.00</td> <td>1.00</td> </tr> </tbody> </table> <p>Edison Lantern Slides, 50 cents each.</p>				CLASS	PRICE OF FILM	EXCHANGE FEE	A	\$2.50	\$.30	B	5.00	.40	C	7.50	.50	D	10.00	.60	E	12.50	.70	F	15.00	.80	G	17.50	.90	H	20.00	1.00
CLASS	PRICE OF FILM	EXCHANGE FEE																												
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F	15.00	.80																												
G	17.50	.90																												
H	20.00	1.00																												
<p>Caution</p> <p>Edison Home Kinetoscopes and Films are covered by United States Letters Patent and the public is warned against purchasing or using infringing parts or apparatus.</p>																														

Edison Home Kinetoscope



Motion Pictures
for the
Home, Schools, Y. M. C. A.,
Clubs, etc.


 Orange, N. J., U. S. A.

Form 2240 7-1-12 cbam

FIGURE 8. Catalog for the Edison Home Kinetoscope. Courtesy of the Edison Historic Site.

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enough to withstand numerous entrepreneurial failures, including its own unsuccessful foray into the home exhibition market in 1912 with its 22mm Home Kinetoscope, a precursor to nontheatrical 16mm projection systems of the 1920s. Sold to the public with marketing reminiscent of the Ikonograph as a “biograph that a child can handle, and that an ordinary living room can hold,” Edison’s Home Kinetoscope was inspired by the inventor’s desire to promote film’s use in educational settings and in the home.⁴⁶ The Home Kinetoscope hit the market in 1912 and was abandoned by the end of 1914.⁴⁷

The Home Kinetoscope projected both its own idiosyncratic 22mm gauge film as well as lantern slides, allowing it to be pitched as a versatile device. It had multiple choices for lenses and light sources: acetylene gas, a Nernst lamp (electric bulb), and a baby arc lamp (the strongest light source of the three).

<p style="text-align: center;">A Jar of Cranberry Sauce Comedy</p> <p>The dime novel fiend bravely prevents a murder in the next room, which proved to be Silas opening a jar of cranberry sauce.</p> <p style="text-align: center;">A Frontier Hero Drama</p> <p>Shep, a beautiful collic, saves little Ruth and her heroic brother, when the former is kidnapped by a hostile savage.</p> <p style="text-align: center;">For the Queen Comedy</p> <p>A charming little story of May Day. The youthful king is lost in his search for the queen’s stolen crown, but is finally rewarded.</p> <p style="text-align: center;">’Tis Now the Very Witching Time of Night Comedy</p> <p>A young clubman has a spooky time in a haunted house, through the kind assistance of his friends and a sleight-of-hand artist.</p> <p style="text-align: center;">Riders of the Plains Miscellaneous</p> <p>An incident in the life of the Northwestern Mounted Police of Canada, showing that wonderful organization in action against some Indian horse thieves.</p> <p style="text-align: center;">CLASS “E”</p> <p style="text-align: center;">Money to Burn Comedy</p> <p>Hungry Bill has a beautiful dream of untold wealth, “swell” clothes, elegant cafes and a Turkish bath—then the policeman wakes him up.</p> <p style="text-align: center;">Papa’s Sweetheart Drama</p> <p>The happiness of a widower’s little family is saved by his daughter, who re-awakens his old love by appearing before him in her dead mother’s dress.</p> <p style="text-align: center;">Egyptian Mystery Miscellaneous</p> <p>The iceman has a terrible time with a pendant which makes everything he touches vanish. A maid, his wagon and a street car are among the victims.</p> <p style="text-align: center;">CLASS “F”</p> <p style="text-align: center;">An International Heartbreaker Comedy</p> <p>Overcome by merriment at the predicament of her lovers, the heartbreaker turns the hose on herself, but don’t laugh or you will get a ducking.</p> <p style="text-align: center;">The Amateur William Tell Comedy</p> <p>The story of William Tell sets the small boy off on a series of Tell-like escapades which re-act upon his conscience when he dreams.</p>	<p style="text-align: center;">Far From the Mad’ding Crowd Comedy</p> <p>A 260 pound man seeks relief from the heat. His adventures at beautiful “Hilcrest,” are screamingly funny.</p> <p style="text-align: center;">A Dash to Death Drama</p> <p>A worthless Italian Duke in trying to escape his American wife’s lover, dashes over a 300 foot precipice in an automobile and is buried beneath it.</p> <p style="text-align: center;">Cocoa Industry, Trinidad, B.W. I. Miscellaneous</p> <p>The cocoa industry is shown in all its phases, from planting to final consumption in the reception room of a New York hostess.</p> <p style="text-align: center;">CLASS “H”</p> <p style="text-align: center;">Max and Maurice Comedy</p> <p>The bad boys of the village play all sorts of tricks upon their neighbors until they are finally ground up in the miller’s flour mill.</p> <p style="text-align: center;">The Ransom of Red Chief Comedy</p> <p>Old Tiptwad’s boy is held for ransom, but he makes life so miserable for his captors that they pay twenty-five dollars to get rid of him.</p> <p style="text-align: center;">The Sign of the Three Labels Comedy</p> <p>Wherein is contained a horrible lesson for the anti-tipping agitators, gathered from the experiences of a couple who fail to tip the bell boys, etc.</p> <p style="text-align: center;">The Doctor Drama</p> <p>A great specialist finds his love of humanity greater than his love for one woman, and she honors him for it.</p> <p style="text-align: center;">Declaration of Independence Miscellaneous</p> <p>A finished and highly instructive handling of this momentous period in the history of our nation, produced with close attention to details.</p> <p style="text-align: center;">Jack and the Beanstalk Miscellaneous</p> <p>Jack climbs to the giant’s castle on the great beanstalk. He steals the giant’s treasures and is saved from him by the good fairy.</p> <p style="text-align: center;">The Battle of Trafalgar Miscellaneous</p> <p>Historically correct in every detail, the film shows the great battle with the burning ships, and finally the deck of the “Victory” and Nelson’s fall.</p>
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FIGURE 9. Catalog for the Edison Home Kinetoscope listing class D through H films. Courtesy of the Edison Historic Site.

The quality of the lens and light source determined the throw and size of the projected image. When Everett projected a Home Kinetoscope from USC's collection at the 2013 AMIA conference, he used a projector with Model C lenses and modified the internal lighting to a modern halogen bulb with a fan for cooling. The Edison Company divided the films for this system into classes, ranging from A to H, with purchase prices from \$2 to \$20 based on the "cost of their production," which was directly proportional to the length of the film.⁴⁸ When an owner tired of a film, he or she could send the film back to Home Kinetoscope in exchange for another film in the same class for the price of an exchange fee—putting into action a version of the Ikonograph plan.

The film used by the Edison Home Kinetoscope is 22mm wide with three separate rows of vertically running images with perforations in the small spaces between the three rows. The operator cranks forward to project the first row of images until "a tiny white spot" appears on the screen; then, using a shifting device, the projectionist adjusts the "baby" film (as Edison's own brochure described it) over to project the next row by cranking in the opposite direction; and, finally, shifting the film once more and cranking a third time, now in a forward direction, to project the final row of images.⁴⁹ A little labor intensive, perhaps—though promotional demonstrations of the technology focused on showing that "this work is performed without fatigue"—but also an efficient way to provide full-length films on a fraction of the film material that would

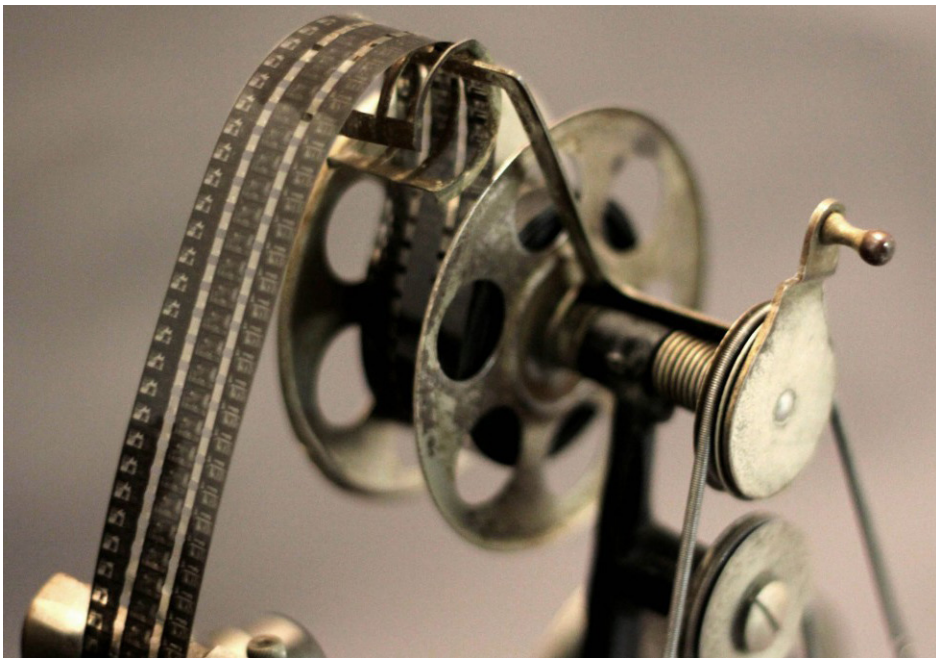


FIGURE 10. The unusual three-row, 22mm Edison Home Kinetoscope film threaded into the hand-cranked projector. Photograph by Dino Everett, USC.



FIGURE 11. 22mm Edison Home Kinetoscope Projector. Photograph by Dino Everett, USC.

have been needed to project the same images at 35mm size.⁵⁰ Each of the Edison Home Kinetoscope frames measures only 5.7mm wide, making the film “perhaps the narrowest gauge ever commercially employed” with “seventy frames . . . crammed into one foot in each row, as opposed to 16 frames per foot in standard film,” allowing “an incredible 210 frames to fit into one foot of film stock.”⁵¹

The Home Kinetoscope turns out to be one of the most confusing projection systems to actually use. Some of its unique aspects that were touted as selling points are also its greatest flaws. First and foremost, while the three rows of images allowed the Edison Company to put a full thousand feet of 35mm material onto a single reel, this also contributed to most of the damage found on surviving films. Because the user had to crank the reel three different times to view the entire film, if a perforation is damaged in the first pass, then that damage is sure to get worse over the course of the second and third passes. Damaging the reel across the entire width of the film affects three separate sections of the content instead of just one.

Another contributor to the damage evident on surviving Home Kinetoscope films is the confusing way that the single metal spring belt must be placed to get the mechanism to easily crank the reels in both directions. If not well placed, or if the tension on the spring is not perfect, then one end of the film (either feed side or take up) will not move properly and will get caught up and damaged. The Edison Home Kinetoscope was likely to damage the film in an array of ways simply through normal use, making replicating its safe use today a special challenge.

The Edison Company tried to convince the public that the projector was “safe,” easy to use, well designed, and even comparable in quality to the Edison projectors being used for theatrical exhibition.⁵² But few users actually exchanged films, suggesting a skeptical public and anemic sales. Ben Singer sums up the death of the system: “marketing mistakes, technological imperfections, a misperceived cultural environment, economic disincentives, basic inconveniences, and an act of God [a fire at Edison’s New Jersey facilities]” conspired to end the life of the Home Kinetoscope not long after its market debut.⁵³ A fitting summation appears in a November 18, 1916, classified advertisement for an Edison Home Kinetoscope with several film subjects and a book of exchange coupons for \$50—less than half of what it would have fetched when first introduced to the market, but not yet, at least, so pitiful a sum as to indicate complete obsolescence.

Singer wonders if the system “ever really gave a good picture, even when running perfectly.”⁵⁴ This can, of course, be discerned through use. Even at its smoothest operation, the Home Kinetoscope still enlarges a projected image from crudely printed, roughly 6mm film. The content of the films available on the system seems at first seems promising and far ranging (at least compared to Ikonograph offerings), but the projected quality is, like its failed predecessor, not good. Competition from another home format released at the same time, 28mm from Pathé, likely compounded the system’s problems in the marketplace. The 28mm format was almost as high quality as professional 35mm being used in movie houses; the Home Kinetoscope was in fact closer to the quality of a toy projector, while also being considerably more complicated to use.

Some films were specifically shot for the Home Kinetoscope (as opposed to being recycled), and the catalog boasted around 160 different titles at its peak. The single film in USC’s collection is a reduction print of a film that the Edison Kinetogram described, upon its original release for the 35mm market on September 10, 1909, as an 810-foot-long “Fantastic Comedy.”⁵⁵ One of the first things we noticed when projecting *The Amateur William Tell* is how susceptible to damage the Edison Home Kinetoscope films were and how cautious Everett had to be to avoid harming the film. The projector utilizes a gear-driven claw that is coupled with a belt-driven film transport. Because the two are only connected

via a wire wound belt, which can slip, they can easily fall slightly out of sync, which can cause the film to be pulled through the gate more slowly than the claw. If this happens, the pin of the claw protrudes into the film itself instead of into the perforated hole, instantly causing damage. Once damage occurs to one small section of film, that damage can quickly create new damage to a nearby section as the film enters the pressure plate.

In addition to this, the film Everett projected was poorly printed and showed significant printed dirt, indicating that quality was not a primary concern at the time of its production. In fact, when the picture is enlarged, the action looks like it is taking place in a light snowstorm, with white specks appearing across the screen, a condition that can be observed in Everett's digitization. The system's mechanical flaws are easily made apparent when running a print through the projector. This is precisely why it is important to continue to operate historical technology even with its attendant risks (in this case to a film that is rare as a 22mm artifact but is not otherwise unique in terms of content) and to transfer the knowledge of how to do this to future generations. This is the only way to ensure an understanding of the complexities, innovations, and deficiencies of the film formats and projectors that came and went during film's first decades, an essential part of the story of how inventors, producers, and distributors tried to expand their reach and how audiences projected moving images for themselves.

Conclusion

Archivists should consider the range of what matters in the preservation of film history. Is it better to use archival film originals and equipment to demonstrate rare or nonstandard film formats such as the Ikonograph and Edison Kinetoscope, or to let nonstandard formats and projection equipment remain inert mysteries of the past? Is it more responsible to project original films, to avoid using originals by producing new prints to demonstrate such systems, or to digitize archival film to create access to the images alone?⁵⁶ While our focus here has been on film equipment and the film meant to be projected in it, this logic applies not only to film projectors, cameras, and film; kindred arguments about the value of preservation through use can be and have been made for analogue audio recording equipment and audio reel-to-reel, camcorders and VHS players, and photographic film cameras and slide projectors, though these technologies are generally simpler and more intuitive to operate than the film projectors discussed here.

Acknowledging the anxieties that confronted the Home Movie Day founders when first considering their projection events, Snowden Becker writes that "Even though film was made to be projected, improper projection can do far

greater damage to film—reaming out sprocket holes by the dozen, burning jammed film, or scratching fragile emulsion—than storage under adverse conditions or any other form of mishandling.” She goes on: “Film archives that projected unpreserved originals from their own collections would be called negligent (or worse) within the film preservation community.” However, the benefits of projection outweighed these deterrants—it was “a calculated—and carefully controlled—risk.”⁵⁷

Anxieties about damage that have permeated the archival field for many decades presume that projection equals destruction. And, while even careful projection can cause damage, this should not be the only or even the primary way archival professionals decide whether or not to project a film. Projection that results in damage is typically unskilled or out-of-practice, or is incurred while using poorly maintained or misunderstood equipment. If, in fact, commitment to the preservation of moving image history should mean far more than preserving just the content of films, it should also mean that at least some archivists can and do regularly project archival originals.

The Council of Library and Information Resources’ (CLIR) 2001 report on the status of the artifact in library collections acknowledges the special challenges posed by media equipment collections due to lack of technical knowledge, access to functional equipment, or availability of skilled repair people. However, film projection involves a fairly rudimentary skill set. Throughout the twentieth century, tens of thousands of people safely operated projectors of all sorts, including children running 16mm projectors in classrooms all over the world. With training and practice, archivists who have the basic skills in place can easily encounter an unfamiliar projector and safely use it. Pointing specifically to film, the CLIR report adds that the “physical artifact itself is an endangered species that warrants special measures to ensure its survival,” the very logic that sometimes ends up being used to stymie the projection of historical materials.⁵⁸ The report concludes that “Technology is increasing the fidelity of reformatting so successfully that most researchers do not need access to the original.”⁵⁹ This is a dangerous logic that risks relegating film historical inquiry to the realm of digital content.

Todd Gustavson, technology curator at the Eastman Museum, believes that the challenge of the field’s current state of technical amnesia is twofold. First, it is getting harder to find archivists with the skills to comfortably use historical projection technologies. Gustavson explains that “in the old days, some mechanical knowledge was part of the job but today that’s not the case.”⁶⁰ He suspects that after his generation of archival and museum professionals has retired, the next generation will likely not have the knowledge to run the equipment that they are tasked with preserving. “They aren’t necessarily difficult [to

operate],” Gustavson notes of early projectors, “but they have idiosyncrasies and don’t necessarily come with owner’s manuals or spare parts.”⁶¹

The second challenge is that institutions are very wary of risking any damage: to equipment, which is expensive to repair, further stressing already overtaxed preservation budgets, or to archived film materials. With this in mind, it is worth remembering that Home Movie Day was initiated outside of any particular institution. The lesson here may be that film archivists need to be creative about how to work with equipment and film, and to question the boundaries placed upon such use by their institutions. It is beyond the scope of this essay to suggest which archives or museums might best bear the responsibility for this kind of work—clearly it cannot be every film-holding institution’s purview to maintain and exhibit diverse collections of projection equipment and film gauges. But conversations about the importance of this kind of preservation and access work need to be brought to the fore. Archivists should not be afraid to reanimate projectors, nor to push back against their marginalization and relegation to storage. One irony of the present situation, Gustavson observes, is that film equipment will last much longer than film but will likely be reduced to existing as sculpture: “It is part of the history that’s going to get lost.”⁶²

NOTES

This article grew out of a series of presentations and demonstrations of various film formats that the authors made at conferences of the Association of Moving Image Archivists starting in 2011. We would like to thank all of the participants in these sessions, as well as Buckey Grimm, who shared Ikonograph resources with us during the drafting of this article, and Andrew Swant, who donated two Ikonograph films to USC’s archives.

¹ From the FIAF Code of Ethics Preamble, International Federation of Film Archives, <https://www.fiafnet.org/pages/Community/Code-Of-Ethics.html>.

² Media Archaeology Lab, “About,” <https://mediaarchaeologylab.com/about>.

³ “Media Archaeology Lab: Opening the Archive, Disrupting the Museum,” *loriemerson dot net* (blog), <https://loriemerson.net/2014/07/25/media-archaeology-lab-opening-the-archive-disrupting-the-museum>.

⁴ John Ellis and Nick Hall, “What Is Hands On Media History?,” *Hands on Media History: A New Methodology in the Humanities and Social Sciences* (New York: Routledge, 2020), 1–2, 3.

⁵ Paolo Cherchi Usai, *Burning Passions: An Introduction to the Study of Silent Cinema* (London: British Film Institute, 1994), 81.

⁶ Alexander John Philip, *Cinematograph Films: Their National Value and Preservation*, Librarian Series No. 3 (London: S. Paul & Co., 1912).

⁷ The functioning printer was known as the Mark IV and was built using parts from a child’s Meccano set. It is briefly mentioned in Anthony Slide’s *Nitrate Won’t Wait: A History of Film Preservation in the United States* (Jefferson, NC: McFarland, 1992), 114. The printer can be seen in use in a Pathé Newsreel from 1963, “Historic Film” (Pathé Colour Pictorial—CP 434), Super8 print at University of Southern California Hugh M. Hefner Moving Image Archive.

⁸ This resulted in an extensive catalog of the films entitled *Early Motion Pictures: The Paper Print Collection in the Library of Congress* (Washington, DC: Library of Congress, 1985).

⁹ Paul Read and Mark-Paul Meyer, *Restoration of Motion Picture Film* (Boston: Butterworth-Heinemann, 2000), 1–2.

- ¹⁰ Giovanni Fossati, *From Grain to Pixel: The Archival Life of Film in Transition* (Amsterdam: Amsterdam University Press, 2009), 71.
- ¹¹ In an earlier article, the authors discussed producing 3mm film, and then filming, developing, and projecting it as a way of preserving and disseminating knowledge about an unusual historic film format. See Marsha Gordon and Dino Everett, "3mm, the Smallest Gauge," *The Moving Image* 16, no. 2 (2016): 1–20.
- ¹² Noel Carroll, "Towards an Ontology of the Moving Image," in *Philosophy and Film*, ed. Cynthia A. Freeland and Thomas E. Wartenberg (New York: Routledge, 1995), 77.
- ¹³ Sam Kula, *Appraising Moving Images: Accessing the Archival and Monetary Value of Film and Video Records* (Lanham, MD: The Scarecrow Press, 2003), 101.
- ¹⁴ "Intrinsic Value in Archival Material," Staff Information Paper Number 21 (1982), National Archives and Records Administration. For the Canadian context, see Judi Cumming, "Beyond Intrinsic Value: Towards the Development of Acquisition Strategies in the Private Sector," *Archivaria* (1994): 232–39.
- ¹⁵ "Recommendation for the Safeguarding and Preservation of Moving Images," UNESCO, section 15c, http://portal.unesco.org/en/ev.php-URL_ID=13139&URL_DO=DO_TOPIC&URL_SECTION=201.html.
- ¹⁶ We are aware that there is an extensive literature about film as a "work of art in the age of mechanical reproduction," to use Walter Benjamin's phrase from his oft-cited 1935 essay. Nelson Goodman's concept of the allographic and autographic might also be applied to this consideration of film's material specificity. For a discussion of these concepts, see Enrico Terrone, "Appearance and History: The Autographic/Allographic Distinction Revisited," *British Journal of Aesthetics* 58, no. 1 (2018): 71–87, <https://doi.org/10.1093/aesthj/ayx034>.
- ¹⁷ Ron Hutchinson's Vitaphone Project, "Home Page," vitaphoneproject.com.
- ¹⁸ Wolfgang Ernst, "Media Archaeography: Method and Machine versus History and Narrative of Media," *Media Archaeology: Approaches, Applications, and Implications*, ed. Erkki Huhtamo and Jussi Parikka (Berkeley: University of California Press, 2011), 247.
- ¹⁹ Ernst, "Media Archaeography," 248.
- ²⁰ Caroline Frick, *Saving Cinema: The Politics of Preservation* (New York: Oxford University Press, 2011).
- ²¹ For criticism of some of Frick's claims about digitization and preservation, see Jan Christopher Horak, Review of *Saving Cinema*, *The Moving Image* 12, no. 2 (2012).
- ²² Snowden Becker, "See and Save: Balancing Access and Preservation for Ephemeral Moving Images," *Spectator* (Spring 2007): 24.
- ²³ For the Code of Ethics, see International Federation of Film Archives, <https://www.fiafnet.org/pages/Community/Code-Of-Ethics.html>. The Society of American Archivists Code of Ethics similarly advocates for access and use, "SAA Core Values Statement and Code of Ethics," <https://www2.archivists.org/statements/saa-core-values-statement-and-code-of-ethics>.
- ²⁴ For the UNESCO definition, see "What Is Intangible Cultural Heritage?," <https://ich.unesco.org/en/what-is-intangible-heritage-00003>.
- ²⁵ Paul Conway, "Overview: Rationale for Digitization and Preservation," in *Handbook for Digital Projects*, ed. Maxine K. Sitts (Andover, MA: NEDCC, 2000).
- ²⁶ Becker, "See and Save." For more information on Home Movie Day, see "About Home Movie Day," Center for Home Movies, <http://www.centerforhomemovies.org/hmd>.
- ²⁷ "About Home Movie Day, Center for Home Movies.
- ²⁸ Marsha Gordon conducted a series of informal interviews via email and telephone in May and June 2019 with Todd Gustavson from the George Eastman Museum; Norma Vega and Cassandra Vadas at the Academy of Motion Pictures Arts and Sciences Archives; Shannon Perich at the Smithsonian Institution; as well as private collectors Rick Malkames and Carey Williams.
- ²⁹ Gordon, interview with Todd Gustavson, Eastman Museum, May 28, 2019. Eastman Museum also has 16mm and 35mm projection theaters, as well as the ability to project nitrate film as part of its screening programs.

- ³⁰ Don Malkames, "Early Projector Mechanisms, with a Foreword by Bernard D. Plakun, *Journal of the SMPTE* (October 1957), reprinted in Raymond Fielding, ed., *A Technological History of Motion Pictures* (Berkeley: University of California Press, 1967), 97. The Malkames collection is now private. Its website describes itself as "A virtual museum of antique motion picture cameras including images, history and unique stories." See The Malkames Collection, <http://www.malkamescameracollection.com>.
- ³¹ Digitized versions of these films stream at <https://www.youtube.com/watch?v=Q8DUCEhHoRI> and <https://www.youtube.com/watch?v=ogLrrRo3WI0>.
- ³² For an overview of early home movie technologies, see Merritt Crawford, "The First Thirty Years," *Movie Makers* (December 1930), 755–57, 783–85. See also Patricia Zimmermann, *Reel Families* (Indianapolis: University of Indiana Press, 1995).
- ³³ Incorporation notice, *New York Times*, February 1907.
- ³⁴ For more on Rector's contributions to early motion picture technological history, including his work on the Veriscope, see Dan Streible, *Fight Pictures: A History of Boxing and Early Cinema* (Berkeley: University of California Press, 2008).
- ³⁵ Alan Katelle, *Home Movies: A History of the American Industry, 1897–1979* (Nashua, NH: Transition Publishing, 2000), 54.
- ³⁶ Ikonograph advertisement, *The Talking Machine World*, July 15, 1907, 65.
- ³⁷ Bankruptcy notices, *New York Times*, August 5, 1910; Bankruptcy sales, *New York Times*, September 19, 1910.
- ³⁸ This was an oft-repeated reminder. See, for example, *The Talking Machine World*, March 15, 1908, 13.
- ³⁹ The Model B was acquired in 1970 as part of the Sol Lesser collection. See footage of the donation of the Sol Lesser collection to USC at <https://vimeo.com/122779389>.
- ⁴⁰ Glenn E. Matthews's chart in the March 1955 issue of the *SMPTE Journal* highlights the fact that the Ikonograph was the "first projector that could reverse the movement of the film." Glenn E. Matthews and Raiffe G. Tarkington, "Early History of Amateur Motion-Picture Film," *SMPTE Journal* 64 (March 1955).
- ⁴¹ "Ikonographs in Demand," *The Talking Machine World*, July 15, 1907, 64.
- ⁴² Based on the films run and digitized at USC, the optimum speeds were 12fps for natural movement and 16fps for comedic scenes.
- ⁴³ *The Disappearing Tramp*, Ikonograph #32, <https://vimeo.com/305098842>; *The Magic Face*, Ikonograph #72, <https://vimeo.com/288266321>; *New York Fire Scene*, Ikonograph #101, <https://vimeo.com/305098717>; *A Quick Shave*, Ikonograph #133, <https://vimeo.com/376938679>; *The Faithful Friend*, Ikonograph #138, <https://vimeo.com/376938380>.
- ⁴⁴ "A Rival of the Phonograph," *The Talking Machine World*, June 15, 1907, 73.
- ⁴⁵ "Alan Kattell Oral History Project," AMIA, <https://amianet.org/wp-content/uploads/Resources-Oral-History-Katelle-1.pdf>, 118–19. Katelle appears to suggest that the Ikonograph films were made both out of nitrate as well as diacetate, noting that Eastman and Pathé were both producing diacetate for professional use in this time period, but that it was less tear resistant than nitrate (121).
- ⁴⁶ The quote is from "Edison Home Kinetoscope," *The Talking Machine World*, May 15, 1912, 54.
- ⁴⁷ Ben Singer, "Early Home Cinema and the Edison Home Projecting Kinetoscope," *Film History* 2 (1988), 45.
- ⁴⁸ Brochure for Edison Home Kinetoscope. Thomas Edison Patent Records, EDIS 53951, Box 1. Thomas Edison National Historic Site.
- ⁴⁹ "Edison Home Kinetoscope," 54.
- ⁵⁰ "Edison Home Kinetoscope," 23.
- ⁵¹ Singer, "Early Home Cinema," 46.
- ⁵² Brochure for Edison Home Kinetoscope. Edison Historic Site.
- ⁵³ Singer, "Early Home Cinema," 62.

- ⁵⁴ Singer, "Early Home Cinema," 59.
- ⁵⁵ *The Amateur William Tell*, <https://vimeo.com/382443279>.
- ⁵⁶ The authors discuss making, filming, developing, and projecting 3mm film in Gordon and Everett, "3mm, the Smallest Gauge."
- ⁵⁷ Becker, "See and Save," 24.
- ⁵⁸ "The Evidence in Hand: Report of the Task Force on the Artifact in Library Collections," (Washington, DC: Council of Library and Information Resources, November 2001), 4, https://clir.wordpress.clir.org/wp-content/uploads/sites/6/pub103_57d70f7019307.pdf.
- ⁵⁹ "The Evidence in Hand," 37–38.
- ⁶⁰ Gordon, interview with Todd Gustavson, May 28, 2019.
- ⁶¹ Gordon, interview with Todd Gustavson, May 28, 2019.
- ⁶² Gordon, interview with Todd Gustavson, May 28, 2019.

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