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### The Decline of Film Manufacturing and Film-to-Film Preservation

Before the advent of digital video technology, film archives relied solely on the photochemical process of film-to-film duplication to create preservation masters of their most valuable holdings. However, over the past decade there has been increased concern about a potential halt in the manufacturing of film stock necessary for archives to continue such practices. A significant decline in production in the same time frame validates these concerns. Since consolidated information about the effect of this decline on analog film archiving practices is sparse, the preliminary survey presented in this writing seeks to expand on the topic. **What does the current film manufacturing landscape look like and how has it changed over the last decade? What are practical impacts on film-to-film preservation programs resulting from discontinued stocks? How have film-to-film preservation programs adapted and what is their forecast for the future?**

**Commented [HB1]:** Excellent framing questions

Through phone conversations with the Library of Congress's Ken Weissman, Colorlab's Laura Major; an interview with Orwo North America's George Campbell; and email correspondence with Mark Toscano of Academy Film Archive, Martin Koerber of The Deutsche Kinemathek, and Jon Wengström of the Swedish Film Institute, some light is shed on these issues. The current state of celluloid production was also assessed through surveys of manufacturer websites. Information compiled from this survey is available in the form of a supplemental spreadsheet.

### Concerns about the future of film stock

The fact that a shift to digital workflows in the production, distribution, and exhibition of moving image works caused a marked decline in film manufacturing over the last decade is irrefutable. Kodak film stock sales plummeted 96% from 2006 to 2014, from 12.4 billion feet to an estimated 449 million (Fritz) and Fuji stopped manufacturing all but one of their many types of film stocks in 2013 (FujiFilm).

According to research on the prevalence of digital restoration practices in European film archives, film preservationists and lab technicians were concerned about the discontinuation of film stock production as early as 2004 (Turci 122). Christian Comte, restorer at the *Archives Françaises du Film du Centre National de la Cinématographique*, was convinced that a halt in film stock production would force the end of analog film preservation work (Turci 113). Luigi Pintarelli, laboratory technician at the *Cinemateca Portuguesa*, also alluded to a potential halt in celluloid production by commercial manufacturers (Turci 113). In the 2007 “Annual Report on Preservation Issues for European Audiovisual Collections,” Richard Wright of the BBC wrote: “The non-digital ‘film as film’ route for preservation of film collections is only viable so long as new blank film stock is being produced (which could be as little as another decade, with many types of film stock already out of production)” (14).

By 2009, movie theaters were rapidly swapping analog projection for digital projection (Westphal), and the American press was teeming with stories pondering the death of film. Roger Ebert, in a 2011 piece titled “The Sudden Death of Film,” lamented the disappearance of 35mm projection in movie theatres and went on to say: “I didn't see the death of film coming so quickly or so sweepingly, and I imagine the manufacturers of film stock didn't either.” More recently, in January 2014, Paramount became the first major Hollywood studio to halt releasing motion

pictures on film in the United States. In response, Jan Christopher-Horak of the UCLA Film and TV Archive said “I’m not shocked that it’s happened, but how quickly it has happened” (Verrier). For over a decade, the death of film has been predicted and lamented time and time again. While it is true that film manufacturers have struggled immensely and downsized massively, film stocks are still being manufactured—from standard 8mm reversal film to 70 mm print film; in color as well as in black and white; and for production, exhibition, and preservation purposes.<sup>1</sup>

There is a relative level of stability in film manufacturing for preservation purposes compared to earlier in the decade (Campbell; Wengstrom). This is a hopeful finding in the face of the concerns about the halt in manufacturing discussed above and the well-known financial struggles of Kodak, the largest producer of film stock, in 2011. While there is not necessarily optimism for the long-term, the situation is not as bleak as Richard Wright assumed in 2007.

#### Film stock availability

The film stocks available to institutions involved in film-to-film preservation drive the type of work that can be accomplished. The ideal types of film necessary to preserve any single moving image work varies completely from project to project and is heavily dependent on the element type, condition, and gauge of the piece being preserved (Major; Weissman). The preservation of original camera negatives in pristine shape require different types of film stocks and different laboratory processes than the processes and stocks required to preserve a faded color print. While no one project will make use of all the different analog film preservation methods and available film stocks, the stocks necessary for comprehensive film-to-film preservation programs to continue include: color intermediate film, color internegative film, black and white fine-grain positive and fine-grain negative film, digital separation film, digital

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<sup>1</sup> See attached spreadsheet.

intermediate film, and print film. These emulsion types would ideally be available in different gauges. All archival film stocks used to make preservation masters would ideally have a polyester base due to the well-known vinegar syndrome that plagues film stocks with a triacetate base.

While companies such as Adox, Foma, Agfa, and Kahl manufacture motion-picture film on a small scale, Kodak and Orwo are the only companies that currently manufacture the types of films on the scale necessary for archives to continue analog film-to-film preservation work. While Fuji discontinued the large majority of their film products in March 2013, it continues to manufacture a digital separation film intended for the long-term preservation of color moving image works (FujiFilm). Kodak's current offering of motion picture films is divided into four main categories: camera films, intermediate films, sound recording films, and print films. Orwo only manufactures black and white film; their current line also includes camera films, intermediate films, print films, and sound recording films.

#### Camera film stocks

All film stocks intended to be shot in camera are acetate-based, due partly to the fact that polyester film's tensile strength is considered too high and could potentially damage expensive film cameras. Kodak offers camera films in color as well as in black and white, in 65mm, 35mm, 16mm, and Super-8mm gauges; these include four different types of negative color film, one type of negative black and white film, and one type of reversal black and white film. As camera films are used solely in production and not in film preservation, they are not wholly relevant to this writing's line of inquiry. However, it would be hard to imagine Kodak discontinuing their negative camera stocks but continuing the production of intermediate or prints films. In fact, Kodak's 2015 deal with major Hollywood studios, which is the main reason that the company

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still makes film, is predicated on the continual production of camera films necessary for Hollywood's filmed products (Giardina).

ORWO film stock currently includes two types of black and white camera film. The N74 Plus film is ORWO's black and white negative film, available in 35mm, 16mm, and super-8 gauges. The UN54 is their reversal positive black and white film (known by ORWO as a Universal Negative stock), offered in 35mm, 16mm, super-8, and even standard 8mm gauges. While ORWO itself does not cut these stocks down to the super-8 and standard 8mm gauges, Kahl, a smaller film manufacturing company in Germany, receives unprocessed raw ORWO stock which it perforates, divides, and packages into smaller gauges (Kahl Film).

**Commented [HB3]:** It's fascinating that they can make a business out of this

Film Ferrania, a resurrection of a long-defunct Italian film manufacturing company, is poised to enter the camera film market by manufacturing reversal 16mm and super-8 film stocks in color and black and white (Film Ferrania). A successful Kickstarter campaign enabled them to secure space and old equipment on the site of the original company's factory (Kickstarter). They are currently in the process of completing the development of the acetate film base for their products and have no plan to enter the archival film stock market (Film Ferrania). Although their model of adapting to the needs of the market may move them to enter the archival film market, the limited equipment at their disposal may limit such an activity (Howell). Three other European companies, Adox, Foma, and Kahl, also produce small-gauge negative or reversal camera films in small batches.

The availability and continual manufacturing of a variety of consumer and professional camera films by the aforementioned companies, in addition to Ferrania Film's fundraising success, indicates that there is still a healthy, albeit niche, market for these products more than 120 years after they were first manufactured. The general level of interest in shooting film is

important for film archives to keep track of as a market indicator since it would be unlikely for companies to manufacture archival films without a market for their camera films.

**Commented [HB4]:** Yes, and historically film archives have not watched the market

### *Intermediate film stocks*

Intermediate film stocks are necessary for the creation of archival preservation masters by photochemical duplication. These stocks are the archive's bread and butter when it comes to film-to-film preservation, the stocks that bridge the gap between projection prints and the often fragile or deteriorating elements of a film that an institution might select for preservation (Weissman). Traditionally these include fine grain masters, intermediate positive films, and intermediate negative stocks, but more recently, digital intermediate and digital separation film stocks are used to accommodate restoration and preservation work that involve digital corrections (Major). Because intermediate films are also used in production, postproduction, and distribution, they are available with both polyester and acetate bases. The focus here is on the polyester intermediate stocks that film archives use due ~~of~~ to their relative longevity compared to acetate film.

### *Color intermediate film*

Kodak is the only company in the world that currently manufactures color intermediate film, making these stocks especially prone to extinction. Kodak still manufactures color intermediate film for both 35mm (2242<sup>2</sup>) and 16mm (3242). These low-contrast films can be used to create either interpositive or internegative color elements (Major). If starting preservation

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<sup>2</sup> A note on Kodak's 4-digit numbering system for film stocks:

- the first digit specifies gauge and base; 2=35mm polyester, 3=16mm polyester, 5=35mm acetate, 7=16mm acetate
- the second digit specifies positive or negative stock; 2=negative film, 3=positive film
- the last two digits specify the emulsion type; i.e. fine grain black and white, color print, digital separation

65mm and 70mm have the same first digit as the 35mm equivalent, and super-8 has the same first digit as the 16mm equivalent.

from a negative element (either camera original or duplicate negative), these stocks can be used for the creation of interpositives (Kodak, “Catalog” 20). The new interpositive can then be used to strike duplicate negatives on the same type of film stock, from which multiple projection prints can then be made (Major; Weissman). For example, if an original nitrate negative was to be preserved by purely photochemical means, it would first be printed onto 2242 stock to create an interpositive, from which duplicate negatives could be struck, also on 2242 stock, and from those duplicate negatives new prints could be made. According to Kodak this film can also be used to create “color duplicate negatives from black-and-white silver separation positives” (“Technical Data 22” 1).

**Commented [HB5]:** This also could benefit from a diagram, akin to what you showed in your presentation.

Kodak’s color *internegative* film (2273/3273), is a polyester-based film stock intended for making a duplicate negative from a reversal camera original or color print. According to Mark Toscano the 2273/3273 are “essentially a polyester version of the 50D camera negative stock” (Toscano, *Preservation Insanity*). These films are used to create preservation masters when no negative elements for a color film survive or the surviving material has been damaged or deteriorated beyond hope. These stocks, along with the aforementioned 2242/3242 intermediate stocks, are essential for creating new preservation elements of any color work that survives only as a print; this encompasses all color home movies and orphan films survived only by reversal camera originals. These are the kinds of films which might be preserved by National Film Preservation Fund grant, making the continued production of these intermediate stocks beneficial to smaller organizations that seek to photochemically preserve special items from their film collection.

*Black and white intermediate film*

Kodak's fine grain duplicating positive (2366) and fine grain duplicating negative (2234) film stocks are used for creating intermediate elements from black and white films. Although both film stocks continue to be manufactured in 35mm, Kodak discontinued manufacturing 16mm black and white intermediate film in 2014 (Major). However, they will cut the stock to 16mm if an order of 80,000 feet or more is placed which is prohibitively expensive for most film labs and film archives (Major). Kodak's discontinuation of 16mm fine grain duplicating positive and negative stocks is especially problematic for institutions such as the Academy Film Archive and Anthology Film Archives which are engaged in the photochemical preservation of experimental films, many of which were shot on black and white reversal film (Major; Toscano, email). When these institutions received news of the discontinuation, they each purchased approximately 10,000 feet of these black and white duplicating stocks (exact footage of each stock purchased by each institution is unknown) and stockpiled them in cold storage for continued use (Major; Toscano, email).

Commented [HB6]: !!!!!

For the Academy Film Archive, which does not have an in-house film laboratory, the services of outside vendors such as Colorlab are utilized to carry out film duplication (Toscano, email). In most cases, Colorlab purchases and provides the raw film stock for their client's preservation projects, but in the case of the discontinued 16mm intermediate stocks, policy has adapted so that clients will have to provide the required film stock (Major; Toscano, email). Mark Toscano of the Academy Film Archive notes that when sending "a batch of 16mm b/w films to Colorlab to work on, I now include a can of raw stock too" (email).

Commented [HB7]: My guess is that the Academy mostly uses Hollywood Labs. Toscano is the Academy's expert on avant-garde and experimental works, which is something that Colorlab specializes in. I expect that he's talking about his own processes, not those that the Academy uses for most of its works (which are probably mainstream).

Despite Kodak's discontinuation of 3366 and 3232, duplicating positive and negative black and white stock for 16mm film is still manufactured by ORWO (Campbell). Jon Wengstrom of the Swedish Film Institute notes that while they use Kodak film stock for almost



all of their film-to-film preservation work, they have to use ORWO film for 16mm black and white work.

### Print film stocks

Kodak, ORWO, and Agfa still manufacture polyester print film. Kodak offers both black and white as well as color print film, while Agfa only manufactures color print film and ORWO only black and white print film. Prints are usually one of the products of a film-to-film preservation project. Even with three companies still manufacturing print film these stocks are especially susceptible to discontinuation since “digital projection has achieved near-complete penetration in American multiplexes” (Westphal). This is a problem for archives such as the Swedish Film Institute and programs such as the National Film Preservation Foundation, who consider making film prints available for access to be a core part of their mission and their analog film preservation activities. Wengstrom believes that while Kodak’s deal with the major studios is beneficial for the continued manufacturing of camera and intermediate film, their “print stock will be more difficult for them to sustain” due to the shrinking market for film-on-film screenings (email).

Commented [HB8]: Definitely a big problem for them

### ORWO and the Library of Congress

The largest film manufacturing operation in Europe is run by Filmotec GmbH, which still manufactures ORWO film stock in Wolfen, Germany. Today the company produces black and white negative camera films, print films, and archival films but no color film stocks (“About FilmoTec”). ORWO North America (ORWONA), based in Brooklyn, New York, is the company’s North American distribution arm. According to George Campbell, who runs the one-man operation from an office in Brooklyn, since he started distributing ORWO film in the United

States in 2011, the large majority of his business has come from the sale of archival intermediate films as opposed to consumer camera films. ORWONA sells only thousands of feet of triacetate camera film annually, compared to millions of feet of polyester archival and print film (Campbell). The Library of Congress (LoC) is ORWONA's biggest client, purchasing approximately 1,000,000 feet of print and archival film every two years since 2011 (Campbell; Weissman).

**Commented [HB9]:** I expect that this is because it's only archives that he markets to. I get lots of email from him. But I bet that filmmakers don't. Though archives are a smaller market to tackle, it's much easier to target advertising and promotion to them.

In 2011, the LoC requested bids from manufactures on a four-year contract for supplying film stocks to the library (Weissman). Kodak, in the midst of massive sale losses, was unable to place a bid since their future was uncertain (Weissman). Although LoC communicated to Kodak that they would encourage them to bid on the contract even if they could not guarantee a four-year supply, the two parties could not come to an agreement in the end (Weissman). ORWONA, then just recently established, was able to bid on the contract and has been supplying LoC with black and white archival film stock ever since (Campbell; Weissman).

**Commented [HB10]:** Though that bid was important to us and to our field, the total amount was low for Kodak. And not nearly in the range that it would interrupt their dealing with a pending bankruptcy.

In 2016, ORWONA also started supplying the Mexican government with 300,000 feet of film for preservation work to be carried out at the National Autonomous University of Mexico (Campbell). In Germany, Orwo sells archival film to the German and Eastern European governments for the same purposes that it sells to the Library of Congress and Mexico here in the United States (Campbell). According to Campbell, although his business of distributing ORWO stock in North America is by no means booming, there are no indications that Filmotec GmbH is going to halt or slow down the manufacturing of their archival films stocks as these stocks are the cornerstone of their business.

### The Swedish Film Institute

The Swedish Film Institute's analog film preservation program is focused on preserving nitrate films in their collection that have not yet been preserved, seeking to create two analogue elements before any digitization is undertaken (Wengstrom). When Nordisk Film Post-Production, the last film lab in Sweden, shut down in September 2011, the Swedish Film Institute decided to create its own in-house laboratory to continue both analog film duplication for preservation and the creation of exhibition prints from their preserved films (Wengstrom et al. 17). The lab has been a success, and running since the latter half of 2012 (Wengstrom). Besides deeming film-to-film preservation necessary in fulfilling their mandate of preserving works in their original format, the Institute considers creating prints for projection, both for in-house exhibitions and for the world, an important part of their access mandate (Wengstrom et al. 18). The idea that it is not only important to preserve their film collection on film but also to provide world-wide access to the material in its original analog format highlights the continuing importance of both archival film manufacturing for long-term storage but also print film manufacturing for the continued exhibition of film-on-film. While the institute acknowledges the challenges in continuing such practices in an increasingly digital environment, it expresses optimism in maintaining its lab and staff, noting that the availability of raw film stock is their most pressing concern (Wengstrom et al. 18). However, they go on to mention that recent signs from Kodak have been positive, and that ORWO's continual manufacturing of black and white archival film is encouraging (Wengstrom et al. 17). Jon Wengstrom of the Swedish Film Institute notes that while prices for film stocks have risen, they have not noticed much difference in their analog preservation activities and all of the film stocks that they need for their work has been supplied so far (Wengstrom).

Commented [HB11]: I think that this is a big question

### The EYE Film Museum

The EYE Film Museum in Netherlands reports that while they continue film-to-film preservation work with their partner, Haghefilm Digitaal lab, especially on preserving experimental 16mm works, they have also considerably expanded their operations to accommodate the expanding born-digital works that are deposited with them for preservation (Wengstrom et al. 20). While there is no mention of specific challenges facing their analog film preservation work relating to film stock, they mention that their budget for analogue preservation work has been stable for the past few years (Wengstrom et al. 19). The EYE is an example of an institution whose traditional practices have wholly changed with the advent of digital filmmaking but continues to engage in film-to-film preservation (Wengstrom et al. 20).

### The National Film Preservation Foundation

Since 1996, the National Film Preservation Foundation (NFPF) has been distributing grants to public and non-profit institutions wishing to preserve films that are not protected by commercial interests. On 29 July 2016, the "Library of Congress Sound Recording and Film Preservation Programs Reauthorization Act of 2016" was signed into law by the President, authorizing the release of up to \$1,000,000 annually through 2026 to the NFPF. NFPF's relevance to this inquiry lies in the program's requirement that all films preserved through grants from the foundation be output to film in the end. Despite the drop in film manufacturing, NFPF maintains at its core this requirement for new preservation elements to be copied onto film as a final product. Two of the three requirements for a project that receives an NFPF grant require an output to film in the end:

**Commented [HB12]:** My guess is that they're finding it increasing difficult to require this, and that they'll eventually need to give up this requirement.

1. New film preservation elements (which may include sound tracks) and

2. Two new public access copies, one of which must be a film print. (NFPF)

**Commented [HB13]:** Good that you found the actual requirements

While the continued distribution of NFPF grant money requiring film-to-film preservation is not enough to guarantee the continued manufacturing of archival film stock by big corporations, it does provide a degree of business to film labs such as Colorlab that have a focus on preservation-centered lab work (Major). The security of the NFPF program and its maximum of \$1 million annual budget (depending on matching donations) is now guaranteed by law for the next decade. While Colorlab explicitly mentions this program as a help to their business, there are no indications that NFPF is involved in efforts to lobby for the continued manufacturing of raw film stock. Further inquiry with NFPF program manager, David Wells, is required to see if the organization is concerned about the future availability of film stock as it is essential for the fulfillment of their current mission.

In addition to ensuring the preservation of the film projects that they fund, NFPF is seeking to provide more access to these works. While a film print for projection is one of the required outputs of the program, it is more likely that in today's world these works find a bigger audience through digital venues such as streaming and DVD releases. In other words, to fulfill their access mandate, NFPF does not necessarily have to rely on film stock. This is an indication that while celluloid is still considered the best archival material for the preservation of moving image works, it is becoming less practical as a medium for providing access to such works. Works such as documentaries, silent films, home movies, and avant-garde films, which are mostly the kind preserved by the Foundation's grants, are unlikely to be exhibited widely on film. Even if manufacturers plan to continue producing film stock into the foreseeable future, the continued diminishment in use for exhibition film prints to provide access may result in the abandonment of creating prints entirely.

**Commented [HB14]:** I absolutely agree. But many film-ophiles don't.

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### Advocacy by archives

While information on relationships between film archives involved in analog preservation and film manufacturers is scarce, there are indications that the International Federation of Film Archives (FIAF) has been active in communicating their archival film stock needs to Kodak in the past few years. FIAF, an international organization of film archives heavily invested in the traditional methods of moving image preservation, has been involved in keeping the use of celluloid in preservation alive through a number of events, projects, and initiatives (Stoeltje). An assembly of FIAF members, referring to themselves as the Future of Film Archiving (FoFA) group, have been meeting since 2012 to discuss “impacts and reactions resulting from the overall shift from analogue to digital” (Wengstrom et al. 17). In the November 2013 issue of the *Journal of Film Preservation*, Gian Luca Farinelli, of the *Cineteca di Bologna*, wrote an impassioned plea to FIAF members, urging them to “launch, under the aegis of FIAF, a SAVE FILM (STOCK) CULTURE project” (14). According to Rachel Stoeltje, a FIAF board member and Director of the Indiana University Libraries Moving Image Archive, there have been meetings between Kodak and FIAF members regarding the need for the continuation of archival film manufacturing. Laura Major at Colorlab, a film lab heavily involved in film-to-film preservation work, while not aware of any initiatives to involve the larger film archiving community in efforts to lobby film stock manufactures, would like to see more concerted efforts in this vein from the film preservation community.

### Conclusion

Succinctly summarized by Paulo Cherchi Usai, one question facing the moving image archiving and preservation field at this juncture is whether moving images are to be “preserved for their 'content', or for the overall cultural context they represent” (“Conservation of Moving

Images” 254)? He goes on to note that if works are to be preserved for their content only, “the way in which [they] are preserved and made accessible is irrelevant, and there is no need to keep a print on photographic motion picture film stock for reasons other than its proven longevity under adequate storage conditions” (“Conservation of Moving Images” 254). While the question of whether efforts should be expended so that in 100 years’ films can still be projected on film is beyond the scope of this project, it remains that celluloid is currently the most permanent carrier for the content of moving image work. It is for this reason, that until a better archival medium for moving image works is presented, efforts should be made by those in the film archiving community to ensure the continuation of raw film stock. While the influence of individual institutions might not extend to corporations ruled by economies of scale that are responsible for manufacturing the technological apparatus necessary for film preservation, an organized effort utilizing Hollywood’s affluence, the government’s regulatory power, and the preservation community’s activism, could be influential, for continuing analog film preservation.

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Before questions such as when a film is considered truly preserved, how much time and resources should be devoted to analog duplication in an increasingly digital media environment, and what films should be preserved in such a way, there has to be the option to do such work. Without the existence of celluloid these questions are purely hypothetical ones. Better consolidated and more concrete information regarding ongoing film manufacturing, shared more widely among the film archiving and preservation community through professional organizations like FIAF and AMIA, could aid institutions capable of analog preservation to make more informed decisions about their long-term and short-term film preservation goals

### **Summary of Findings**

-There are three corporations that produce stocks used for preserving moving image works on film: Kodak, ORWO, and Fuji.

-There are three corporations that produce stocks used for creating archival prints: Kodak, ORWO, and Agfa.

-There are at least 10 different film stocks necessary for preservation activities that are still being manufactured.<sup>3</sup> This does not include various sub-types relating to film gauge.

-The most inconvenient film stock discontinuation for film-to-film preservation was Kodak's halt in manufacturing 16mm black and white duplicating positive and negative stocks, their print film used for leader, and high contrast film (Toscano). ORWO has been mostly able to fill that gap.

-The Library of Congress had to switch from Kodak stock to ORWO stock in 2011 due to Kodak's inability to guarantee the manufacturing of the film needed by LoC to continue their preservation work.

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<sup>3</sup> See attached spreadsheet.



Works Cited

- “About FilmoTec.” *Filmotec GmbH*, [www.filmotec.de/?page\\_id=112&lang=en](http://www.filmotec.de/?page_id=112&lang=en).
- Academy of Motion Picture Arts and Sciences. “Digital Dilemma: Strategic Issues in Archiving and Accessing Digital Motion Picture Materials” *Oscars.org*, 2007. Accessed 8 Oct. 2016
- Academy of Motion Picture Arts and Sciences. “Digital Dilemma: Perspectives from Independent Filmmakers, Documentarians and Nonprofit Audiovisual Archives” *Oscars.org*, 2012. Accessed 8 Oct. 2016.
- Campbell, George. In-person interview, 22 Nov. 2016.
- Cherchi Usai, Paulo. “The Conservation of Moving Images.” *Studies in Conservation*, Vol. 55, No. 4, pp. 250-257, 2010. *JSTOR*, [www.jstor.org/stable/42751725](http://www.jstor.org/stable/42751725).
- . *The Death of Cinema: History, Cultural Memory and the Digital Dark Age*. BFI Publishing, 2001.
- . *Silent Cinema: An Introduction*. BFI Publishing, 2000.
- Ebert, Roger. “The Sudden Death of Film.” *RoberEbert.com*, 2 Nov. 2011.
- Fairall, Charles. “FoFA: The Future of Film Archiving.” *Journal of Film Preservation*.94 (2016): 9-16. ProQuest. Accessed 6 Oct. 2016.
- Farinelli, Gian Luca. “Film Archives After Film.” *Journal of Film Preservation*, no. 89, Nov. 2013, pp. 13-14. *ProQuest*.
- Film Ferrania. “FAQ.” [www.filmferrania.it/faq/](http://www.filmferrania.it/faq/).
- Fritz, Ben. “Movie Film, at Death’s Door, Gets a Reprieve.” *The Wall Street Journal*, 29 Jul. 2014, [wsj.com/articles/kodak-movie-film-at-deaths-door-gets-a-reprieve-1406674752](http://wsj.com/articles/kodak-movie-film-at-deaths-door-gets-a-reprieve-1406674752).
- FujiFilm. “Discontinuation of Motion Picture Film Production.” 2 Apr. 2013, [fujifilm.com/news/n130402.html](http://fujifilm.com/news/n130402.html).

- Giardina, Carolyn. "Kodak Inks Deals with Studios to Extend Film's Life." *The Hollywood Reporter*, 04 Feb. 2015, [hollywoodreporter.com/behind-screen/kodak-inks-deals-studios-extend-770300](http://hollywoodreporter.com/behind-screen/kodak-inks-deals-studios-extend-770300).
- Howell, Dylan. "100 More Years of Analog Film: Film Ferrania Announces Comeback Plan." *Fstoppers*, 30 Sept. 2014, [fstoppers.com/film/100-more-years-analog-film-film-ferrania-announces-comeback-plan-39197](http://fstoppers.com/film/100-more-years-analog-film-film-ferrania-announces-comeback-plan-39197).
- Kahl Film. "Orwo Movies." [kahlfilm.de/content.php?nav=91](http://kahlfilm.de/content.php?nav=91).
- Kickstarter. "100 More Years of Analog Film." [kickstarter.com/projects/filmferrania/100-more-years-of-analog-film](http://kickstarter.com/projects/filmferrania/100-more-years-of-analog-film).
- Kodak. "Motion Picture Products Price Catalog." 01 Dec. 2016. [motion.kodak.com/KodakGCG/uploadedFiles/Motion/Products/Product\\_Information/Kodak-Motion-Picture-Products-Price-Catalog-US-Prices-Dec-2016-V5.pdf](http://motion.kodak.com/KodakGCG/uploadedFiles/Motion/Products/Product_Information/Kodak-Motion-Picture-Products-Price-Catalog-US-Prices-Dec-2016-V5.pdf)
- . "Color Internegative Film 2273, 3273." Jul. 2015, [motion.kodak.com/KodakGCG/uploadedfiles/motion/5273\\_ti2655.pdf](http://motion.kodak.com/KodakGCG/uploadedfiles/motion/5273_ti2655.pdf)
- "Library of Congress Sound Recording and Film Preservation Programs Reauthorization Act of 2016". [congress.gov/bill/114th-congress/senate-bill/2893/text](http://congress.gov/bill/114th-congress/senate-bill/2893/text)
- Major, Laura. Phone interview, 21 Nov. and 29 Nov. 2016.
- National Film Preservation Foundation. "Basic Film Preservation Grants." [filmpreservation.org/nfpf-grants/basic-preservation-grants#Eligibility](http://filmpreservation.org/nfpf-grants/basic-preservation-grants#Eligibility)
- Stoeltje, Rachael. Email communication, 4 Oct. 2016.
- Toscano, Mark. Email communication, 28 Nov. 2016.
- . "Later That Same Night (1971) and Pastorale d'Ete (1959) by Will Hindle." *Preservation Insanity*, 5 Aug. 2012, [preservationinsanity.blogspot.com/2012\\_08\\_01\\_archive.html](http://preservationinsanity.blogspot.com/2012_08_01_archive.html).

- Turci, Arianna. "The Use of Digital Restoration within European Film Archives: A Case Study." *The Moving Image: The Journal of the Association of Moving Image Archivists*, vol. 6, no. 1, Spring 2006, pp. 111-124.
- Verrier, Richard. "Paramount stops releasing major movies on film." *Los Angeles Times*, 18 Jan. 2014.
- Weissman, Kenneth. Phone interview, 15 Nov. and 18 Nov. 2016.
- Wengstrom, Jon. Email communication, 29 Nov. 2016.
- Wengstrom, Jon, et al. "FoFA Case Studies: 2012-2015." *Journal of Film Preservation*, no. 94, Apr. 2016, pp. 17-24. *ProQuest*.
- Westphal, Kyle. "Who Will Save the Cinema?" *Northwest Chicago Film Society*, 2 Aug. 2014, [www.northwestchicagofilmsociety.org/2014/08/02/who-will-save-the-cinema/](http://www.northwestchicagofilmsociety.org/2014/08/02/who-will-save-the-cinema/).
- Wright, Richard. "Annual Report on Preservation Issues for European Audiovisual Collections." BBC, 2007. *PrestoSpace*.