

## 3

## The Ethics of Film Preservation

A motion picture lives three months at most. There is no use pretending we are making pictures for the ages.

Darryl F. Zanuck

## Genealogy: Print Generation, Provenance, Format

The silent film we are about to watch is not an abstract entity brought to us through a logical pattern designed by history on behalf of posterity. It is the survivor of a complex, often random process of selection, not much different from a Darwinian evolutionary scheme. When we consider the limited number of prints struck for a film of the early years, and take into account the variety of factors contributing to their loss or decay, the very existence of a nitrate copy one hundred years after the making of the film may be seen as something close to a miracle.

A large group of silent feature films was found several years ago in a barn somewhere in the American Midwest. Most of the reels were in good condition, but for no apparent reason each individual film was lacking the first or the last reel. It was later determined that the missing reels had been used by some local kids for a rather daring form of fireworks display, in which the film was removed from the cans, unspooled, and then ignited at one end of the leader. The game was dangerous – gases produced by burning nitrate are extremely toxic; inhalation can cause death within a few hours. Still, the witnesses to this playful destruction of film heritage were not aware of that, and the sight of flaming celluloid must have been quite spectacular.

No less astounding was the discovery in 1978 of a swimming pool in Dawson City, the most unlikely repository for 510 reels of nitrate film forgotten by distributors after their exploitation in that remote region of Canada. The severe cold temperatures in northern Yukon, and the unusual protection given to the prints in the underground shelter, uncovered by an excavator half a century after their burial, ensured the physical survival of about 435 of these long forgotten treasures. Several factors, including the temperature shock caused by the sudden retrieval of the films from the frozen ground and their contact with sunlight and humidity, might have contributed to the melting of the emulsion around the edges of the reels. Several prints in the Dawson City Collection at the Library of Congress are easily



*The Half-Breed* (Allan Dwan, 1916), 35mm acetate print (Library of Congress/Dawson City Collection).

recognisable by this characteristic, which blurred the contours of the frame. These episodes are among the most bizarre in the history of film preservation, but they are not isolated. Nitrate prints can turn up anywhere, and we often know about it only when it is almost too late to do anything to protect them. What has safely reached the vaults of the archives is only the carefully monitored tip of a thawing and highly volatile iceberg. The sheer dimensions of this iceberg may be better appreciated by turning it upside down and viewing it as a genealogical tree, at the apex of which is the camera negative originally used to make distribution prints at the time of a film's initial release.

Let us imagine, for argument's sake, that two parallel black and white camera negatives of an American feature film were made in 1914, according to the practice mentioned on page 11. The first negative was to be used for the domestic market, while the second was recut for the European market and sent to London. In our example, let us suppose that nineteen positive prints (tinted and toned) were made from the first negative in the United States, while sixteen copies of the edited version were struck abroad, with intertitles translated in different languages, and with different tinting and toning schemes, for each country where the film was shown. Let us also assume that by the end of World War I, both camera negatives had disappeared, and that in 1925 one of the 'domestic' positive prints was used to create a black and white duplicate negative from which to make prints for the re-release of the film. Pursuing our imaginary case study, twelve positive prints (not tinted) were then struck from the duplicate negative. In 1936, a private collector found one of these prints, loved the film despite the absence of colour, and made another duplicate negative and three prints, for personal use and trade. In 1948, an entrepreneur got hold of another copy of the 1925 re-release version, trimmed all the shots to make the editing snappier, and from this created a duplicate negative and ten prints for distribution in the non-theatrical market. One of these 1948 prints was borrowed in 1952 by a film society, and on this occasion someone kept it long enough to send

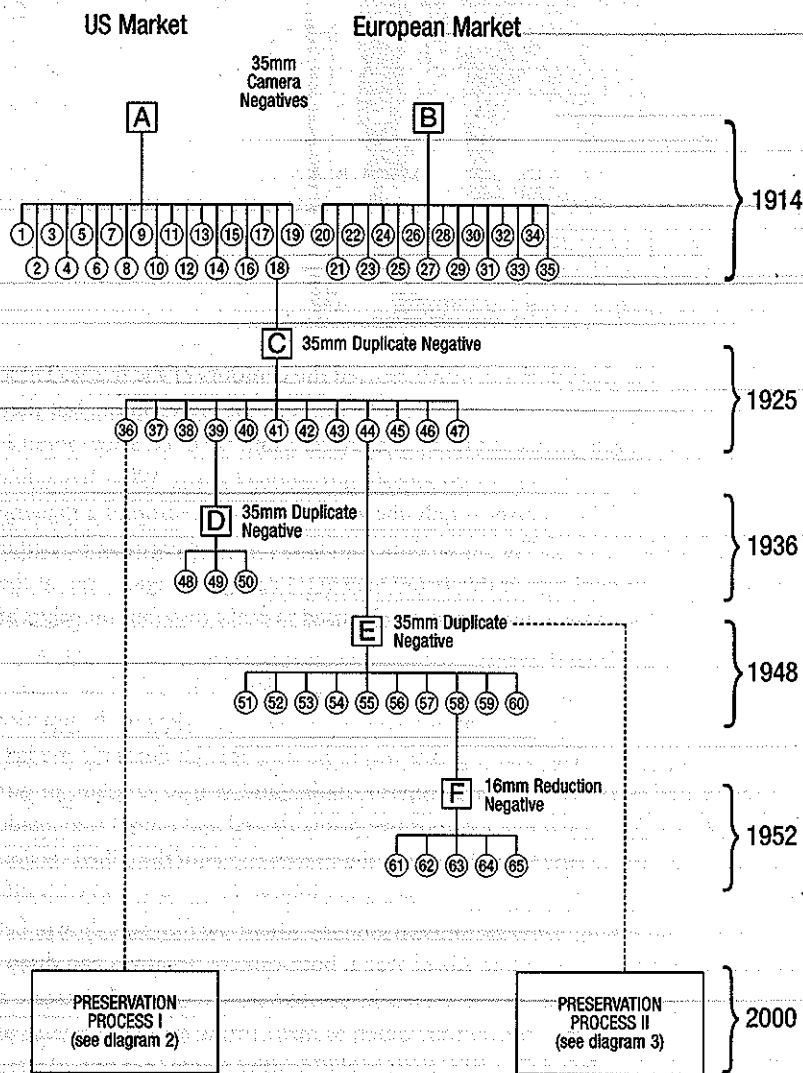


Figure 1: Print generation in history.

it to a laboratory and make a 16mm reduction negative. From this she printed five copies of the film, eliminated from each of them some scenes which seemed to her controversial, and then sold the abridged versions to schools and public libraries.

Our story could go on like this indefinitely; but if we decide to interrupt it at this point, the plot could be summarised by Figure 1.

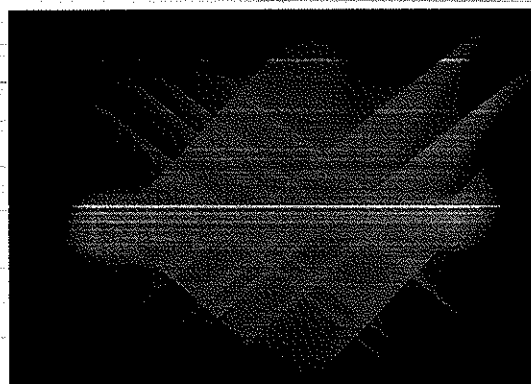
All in all, our film came to exist in six negatives and sixty-five positive prints, five of which were made on 16mm stock. The scenario described above may look excessively complex; in fact, it is a wildly oversimplified mirror of reality. Many silent films were subject to a much larger number of duplications, and in most cases we have no idea of how many prints were made at any given step of the process, nor can we reconstruct its actual chronology. More often than not, we can't even tell whether the process has come to a conclusion, or is being continued in forms and circumstances that are – and will probably remain – forever unknown to us. Take any early Chaplin short, and you will soon realise that the 'big bang' of the original camera negative has created a constellation of copies we will never be able to quantify.

What really matters in our fictional account, however, is that we have come to terms with two crucial issues. First, the fact that the archive print we are looking at may belong to any one of the phases identified in our imaginary duplication process. Exactly where the print stands in the genealogical tree may make a world of difference, both in terms of its completeness and its visual quality. For example, watching a 1948 print corresponding to item number 52 in the diagram would probably tell us very little of how print number 4 looked in 1914. Furthermore, what we have so far called a 'step' in the duplication process (the making of a negative and the subsequent creation of one or more prints) corresponds to a print generation. Broadly speaking, each photographic generation involves a loss of approximately 15 per cent from the image information of the previous print. Think of a copy derived from a tenth generation negative, and you will get a rough idea of the gap between its appearance and the look of a print struck from the original camera negative. The frame enlargement of Fritz Lang's *Metropolis* reproduced overleaf (A) comes from a 35mm nitrate positive print made from the original camera negative. Frame B is taken from an 35mm acetate print of unknown generation, possibly the third, made in 1987. Frame C shows the same frame as it appears in a 16mm print made in 1954. See the difference between this one and the first of the series? Don't ask what generation it belongs to. It takes many of them – or just a very bad printing job – to make the image so foggy, but don't ever think this is how *Metropolis* was intended to be seen. Now, look again at Frame B, and note how little difference there is between its image quality and the appearance of the same frame in the enlargement of the 16mm copy. In both prints, the title is barely readable, but the 35mm has a coarseness and a contrast surprising for a print that should definitely look better than a 16mm duplicate. There are at least two possible reasons for this. First, the processing of the 35mm copy may have been less than appropriate; second, the 16mm print may have been struck from a source belonging to an

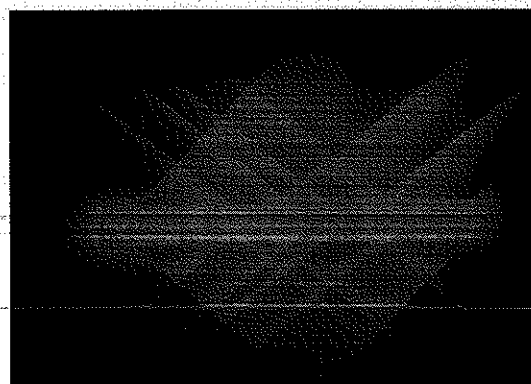


A

*Metropolis* (Fritz Lang, 1926), main title. From top to bottom: (A) first-generation 35mm nitrate positive print from the National Film and Sound Archive/ScreenSound Australia; (B) 35mm acetate print from the 1987 restoration, Münchner Filmmuseum; (C) 16mm triacetate print made in 1954, George Eastman House.



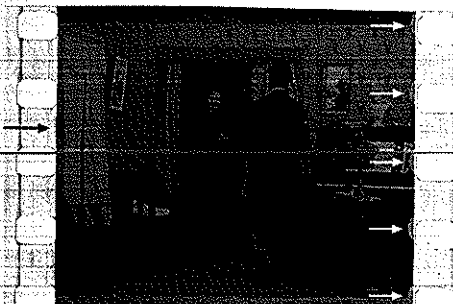
B



C

earlier generation than that used for the 35mm positive. The lesson to be drawn from this instance has been hard to learn for film archives, which have traditionally considered substandard formats as objects of little or no archival significance. Never underestimate the potential value of a 16mm print – nor, for that matter, of any format under 35mm, such as 28mm, 22mm or 9.5mm. Print elements made in forms other than the original one might represent the best quality copies you will ever see for certain films, and might prove to be in much better shape than a battered, incomplete 35mm duplicate print from a very remote generation.

Obviously, the goal of every film archive is to locate and acquire a print as close as possible to the original camera negative. When it comes to silent film, finding the camera negative itself is a fortunate yet rare occurrence. (Two remarkable exceptions are the Metro-Goldwyn-Mayer negatives preserved at the George Eastman House and the D.W. Griffith shorts of the Biograph period, held by the Museum of Modern Art in their original form, although without intertitles). Most curators would be more than happy to settle for a first generation print, often recognisable by the absence at the edge of the frame of any photographic evidence of sprocket holes other than those belonging to the negative (see below). This goal, however, is thwarted by a near-universal law of film preservation: while a film of little or no commercial fortune is unlikely to have been duplicated much, and so will probably be found in prints of very early generations, pictures that were great popular successes in their time and have remained in demand by subsequent audiences are often to be seen in copies several generations away from their origins. The examples of *Metropolis* and the Chaplin shorts are two obvious cases, but the list of masterworks available only in prints far from ideal is quite extensive. There is for instance no copy of *Sunrise* (Friedrich Wilhelm Murnau, 1927) that approaches the beauty of a first generation print, and whatever is left of *The Blue Bird* (Maurice Tourneur, 1918) is a far cry from the beautiful nitrate prints originally struck from the camera negative. To make a long story short, archives have only two options: to be content with the best they can find, or to keep on searching for better copies, believing in miracles and hoping for the best.



Print generation as seen through the profile of sprocket holes. *The Voice of the Violin* (D.W. Griffith, 1909), 35mm acetate print. The white profiles of the four sprocket holes visible in the right margin of the image are from the 35mm nitrate positive used for the creation of the 35mm viewing print reproduced here. The dark profile of the single sprocket hole on the center left edge of the image is from the 35mm camera negative of the film (George Eastman House).

Miracles do sometimes happen, as in the case of a gorgeous 35mm nitrate print of *La Passion de Jeanne d'Arc* (Carl Theodor Dreyer, 1928) which lay quite forgotten for several decades in a mental hospital in Norway until it was retrieved intact in 1981.

Given the situation, there should be no surprise that the assessment of print generation and the retrieval of relevant clues about the provenance of a copy play such an important role in the preservation process. Film historians who care about this aspect of archival work are often frustrated by the scarcity of information surrounding the circumstances under which a particular film was acquired by an institution at the end of the nitrate era. At that time, finding a lost film was all that really mattered: who would care, after all, whether a print was found in a dumpster, or bought from dealers who had no interest whatsoever in letting people know where the print came from and how it got into their hands? The irony of all this is that they were secretive mainly out of fear of being stalked or legally threatened by copyright owners, whereas production companies couldn't care less about what happened to a used print. Periodically, it is true, they might get worried – as they did for a brief period in the 1970s, when FBI officers would question collectors such as William K. Everson – only because they were suddenly afraid of an unlikely resurgence of illegal, non-theatrical distribution. Today, the cost of putting corporate companies' lawyers on the trail of a private collector who is showing the film in a basement to a group of friends is not generally considered worth the effort. The money obtained through the distribution of bootleg videos for personal use is less than peanuts for the majors. Corporate firms know all too well that there are duplicate prints all over the place, but they would not make much profit in taking control of the collectors' world. On the contrary, they would no doubt lose face from being perceived as the enemies of non-profit film culture, and moreover lose the invaluable advantage of potential cooperation from an underground army of enthusiastic cinephiles. It's much better to get their help instead. As we will see further on, film preservation has become a useful public relations tool for the film industry, but never be astonished if a production or distribution company's legal office is unaware of a title owned by its firm. Once in a while, archivists who have found a film and would like to know if the producer has other elements of it may even receive startling answers: 'What are you talking about? We don't have copyright on this film. In fact, it looks like we didn't make it. It doesn't appear in our inventory.' As a rule, film entrepreneurs were not good filmographers, and their successors may not even know what they own.

Archivists have traditionally been very fearful of letting researchers browse through the historical papers related to the acquisition of a silent film. Today they are generally less paranoid about this, and are actually becoming quite active in keeping records of whatever written material they come across, and scrutinising their departmental records for correspondence, memos, shipping orders and laboratory bills – all useful stuff for nowadays' determined researcher, leading to revealing hints of how and when a certain film first ended up in the vaults. Archive managers will have a hard time figuring out how their first prints entered the

premises of the institution, but it is as much their problem as ours, and we now all have to live with it.

Let us now return to the diagram on page 46, and suppose that the genealogical tree represents the printing history of a hitherto missing film, now found as a single print (say, the 35mm nitrate positive number 36), the only one known to exist. The archivist is happy. Film scholars are happy, too, but that's only the beginning of a completely different and no less intricate story.

### The Preservation Process

What now happens to that surviving print is the object of the art and technique of preserving moving images. In a museum context, our positive copy number 36 is considered as a unique object, and is therefore withdrawn from public access. There is already an important principle to be stressed here. If she knows that the print is far from being unique, and the existence of another two hundred copies of that film is documented, the archivist would probably decide to retain it anyway, because its presence in the vaults is consistent with the educational mission of the institution; and she would leave it at the viewer's disposal, subject only to limitations pertaining to the basic need to minimise the physical consumption of the artifact. This is a tricky argument, though. When a print is worn out, it may not be that easy to replace it. Since it was generally thought that the films of Charlie Chaplin could be found all over the place (there are indeed hundreds of copies around the world), everybody kept showing them freely until it was discovered that in fact acceptable preservation elements were no longer to be found. Now we are desperately searching for nitrate prints of Chaplin's early titles, and it is clear that there aren't that many left in an acceptable condition.

Another example may further clarify the issue. A film archivist in Indonesia finds the print of a film that is already preserved in China. Should the Indonesian archivist consider his print a reference copy, and let it be projected indefinitely? What if the preservation elements held by the Chinese archives are less than perfect? What if they are incomplete? What if they didn't preserve the other print at all? What if a fire destroys their vaults? In that case, the Indonesian print would become truly unique and therefore an 'archival master' in the fullest sense of the term. Predictably enough, there is no easy solution to this dilemma, and some archives have no other choice than to take the hard line and consider as an 'archival master' every print that is not otherwise adequately protected within the premises of the institution, regardless of its status in other fellow archives.

What 'protected' means is roughly summarised in Figure 2.

Our print number 36 is cleaned, repaired, and put in cold storage, as it is known that constant low temperatures and humidity levels normally guarantee a longer life to the film. It is at this point that preservationists must decide how to make the film accessible to present and future generations. As much as it is useful as a tool for altering or recreating portions of a damaged moving image, digital technology

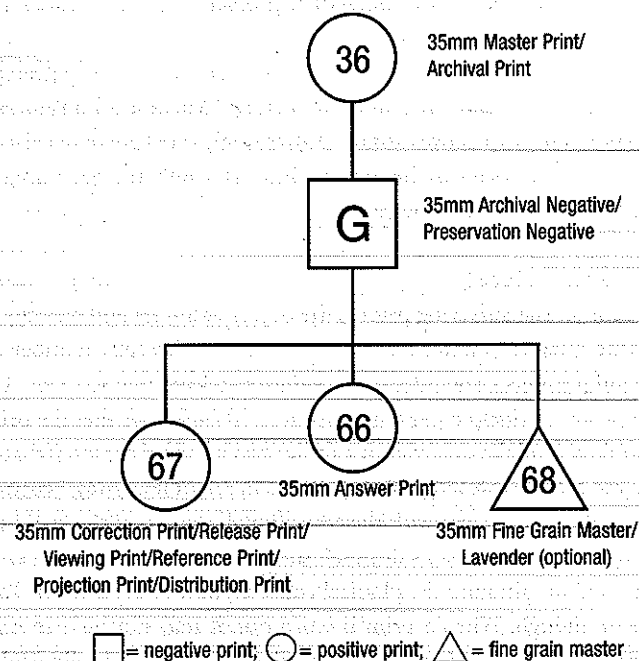


Figure 2: The preservation process. Duplication pattern from a positive print.

has not found a way to protect it for an extended period of time; in fact, a restoration pursued exclusively with digital means is bound to have a much shorter lifespan than a reproduction achieved with photomechanical means. Scientific research has focused on a number of possible long term solutions. One of these involves the etching of the visual information by digital means on a metal plate (steel, or nickel, as in the case of optical disk stampers) – a technology which is relatively well known, but has limitations in terms of data density and also in terms of the survivability of the metallic surface upon which data is encoded. Another entails the creation of data resources in the form of ion-etched quartz (where accelerated ions are used to create a pattern at the atomic level within an artificially grown crystal of quartz). This latter method offers the possibility of high-density data storage and the ability to store both digital and analog information in a substance which appears to be stable over extremely long periods of time and is largely unaffected by storage environment. Yet another proposal is holographic bubble memory that could inhere in a relatively permanent medium such as quartz or glass.

Unfortunately, none of these technical options is developed enough to offer a solution today. Furthermore, none of these systems presents a simple image (as does a film master); all of them require the migration of data into a non-iconic, coded

data form for storage, and then a device for rendering the decoded image data back to film. Regardless of the permanence of the data substrate of such exotic media, the long-term viability of these technical systems (the hardware and software necessary to make them work) is seriously in doubt. Thus, the most durable preservation carrier for the moving image is still an object resulting from the use of photographic methods. The rest of this chapter will therefore address the issue of film preservation on the basis of this assumption.

As soon as financial resources allow it, the print is taken to a laboratory, and a negative element (of the same format, if possible or required) is produced. Optical printing with photographic means can be achieved through normal contact printing (a positive and a negative film are continuously run through the printer), or through step printing (each frame of the film is exposed individually in front of the duplicating element). The latter is a much slower but accurate process, used for severely damaged or shrunken copies. The laboratory strikes one print ('answer print') in order to verify the quality of the negative, makes corrections if necessary, then produces one or more prints for access. Terminology varies from archive to archive: 'viewing print', 'projection print', 'reference copy', 'distribution print', 'access copy', 'release print', 'show print' may mean slightly different things, but what they have in common is the fact that they can be viewed because their gradual loss of quality or accidental damage will not endanger the survival of the archival master and the negative. It is clear, however, that the negative is in itself a fragile object which should not be used indefinitely, whenever a viewing print gets in bad shape; in fact, archivists would very much prefer not to use it at all, in order not to jeopardise its status of 'preservation negative' (as this element is frequently called). That is the reason why it is always a good habit to make at least two prints from a newly preserved film, and leave one as a reserve in case of irreversible damage to the other. If a certain film has to be used several times and in different venues, it would even be advisable to take an additional step: create a 'fine grain master' (such as print number 68 in Figure 2; we will explain in a minute why it is called that) and an 'intermediate negative' (not reproduced in Figure 2) from the fine grain master, and only allow additional copies to be made from this printing element; but very few archives have enough resources to do this. While producing a fine grain master is always a good idea if the institution can afford it, going any further would almost defeat the purpose for the existence of an archive, making the institution an awkward equivalent of a distribution company.

Now that we have dealt with the average scenario, it may be worth mentioning the second most likely one (Figure 3). The archive has found item E in our genealogical chart, a nitrate negative. Its preservation involves a different treatment, starting with the creation of a 'fine grain master'. This looks like a positive print (theoretically, it can even be projected), except for the fact that it is printed on a film whose emulsion – made of much tinier molecules – is particularly suitable for making an intermediate negative to be used for the positive prints destined for access.

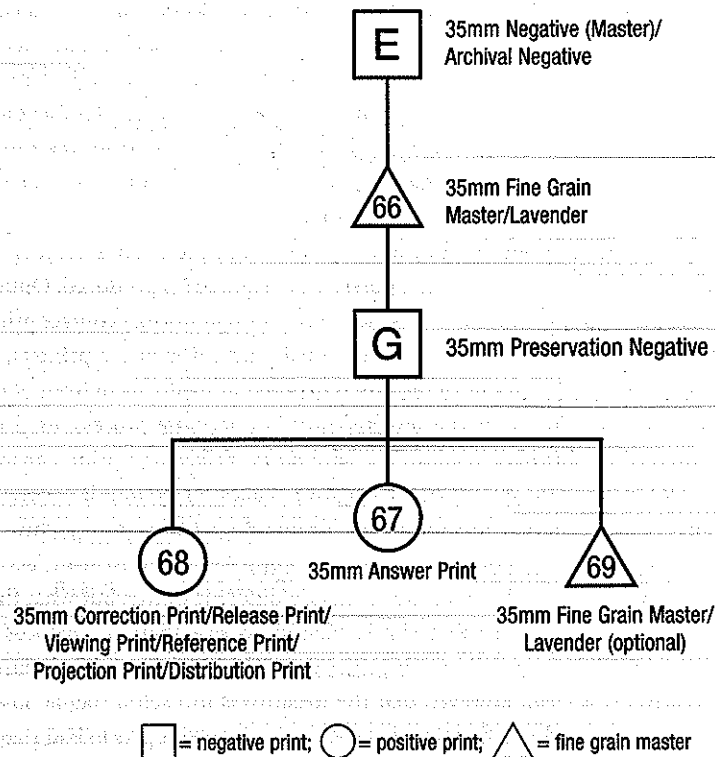


Figure 3: The preservation process. Duplication pattern from a negative print.

### The Colour It Might Have Been

A film surviving only in the form of an 'archival negative' and a 'fine grain master' is materially preserved, in the sense that we don't have to worry too much about the decomposition of the first element; but this does not mean that the film it represents can be viewed. Whether we like it or not, the archive may have decided that this is where the preservation process is going to stop for the time being, and no viewing print is going to be made. It is now time to look again at Figure 2, and imagine that the element number 36 has some colour on it. As we have seen at the end of Chapter 2, archives have dealt with the ontological problem of the inevitability of colour decay without being able to give a final solution to the issue. For years, preservation of colour film on black and white prints (their emulsion is much more stable than the multi-layered colour emulsion) seemed the only viable alternative to colour degradation, but its contradictions have become increasingly apparent. Plates 45A and B, respectively taken from a nitrate original and a duplicate in black and white, provide ample evidence of this point. Museums have now grown a little more daring, and in the meanwhile image technology has improved enough to jus-

tify other approaches to the question. At least four possibilities ought to be mentioned:

1 *The positive print is tinted and/or toned.* Until the 1980s, this kind of colour was generally reproduced through a standard colour negative and positive prints, vulnerable to the degradation process mentioned above. Since then, three different options have been taken into consideration.

A The first is the creation of a black and white negative, whose processing is timed in such a way that the resulting positive could be struck on colour stock through the use of coloured filters or computer-generated tints. This system has the advantage of involving the production of a black and white conservation element, comparatively easy to preserve for a longer time without major image alteration. A relative disadvantage is, of course, the fact that the viewing print is on standard colour stock. Another more important drawback is that the system is good for the reproduction of tinted films, where the image has only one colour at a time, but cannot be applied to films where two colours are combined (tinting and toning).

B A technique that been applied for some years, but became known in the 1990s in a variation called the Desmet System or Desmetcolor (from the name of technician Noël Desmet, head of the preservation laboratory at the Royal Film Archive of Belgium) entails two consecutive exposures of the positive print, thus allowing the reproduction of a tinted base and a toned emulsion.

C For many years, specialists have also tried to pursue their goal the hard way, attempting to recreate tinting and toning by following the original formulas for dye baths, still available in various manuals published during the silent era. Interestingly enough, these systems have often proved extremely impractical (as each print must be treated separately) or unsuccessful: some of the original dyes are no longer available commercially, or their application on modern stock rarely results in colours of comparable stability or resemblance to the original.

2 *The positive print has been coloured by hand, mechanically (i.e., stencil or Handschiegl), or was printed with a subtractive process such as Technicolor nos 2 or 3.* There is not much of an option in this case. French film historian, Jacques Malthête, has tried to apply colour manually to modern prints of films by Georges Méliès, but the process was excruciatingly slow and the results have raised severe methodological objections. No better solution has so far been found than the standard duplication on colour negative stock and colour positive prints. Hand-painted, stencil-coloured and Handschiegl prints are traditionally the most difficult to reproduce, and the most disappointing when modern results are compared with the original nitrate sources. Contrary to common belief, 'remaking' a stencil copy is a hopeless task, even with the aid of

modern techniques. It is also an absurd goal, as we will never know exactly what the shape of the stencil really was, and no trace is left of the corresponding matrix.

3 *The positive was made with an additive colour process such as Chronochrome (see p. 30) or Kinemacolor (p. 29).* The original prints in black and white were intended to be shown on projectors equipped with coloured lenses or special blade shutters with coloured filters. Here we have another reminder of how important it is to preserve film equipment with as much care and attention as we give to the film itself. Some of these machines are still extant, but few of them are in working condition, and their use for actual projection is normally out of question. Technology has now been developed to reproduce the effect of these images when projected onto a screen, often with outstanding results (notably in the case of Gaumont's Chronochrome system). Unfortunately, modern prints (normally generated by standard colour negatives and therefore resulting in standard colour films) derived from originals made with these systems can do no more than interpret the impression of a viewing experience achieved through completely different means. With few notable exceptions (with Kinemacolor) they simulate what the audience may have seen, but they necessarily bypass the optical principles of the devices built to display those images, thus falsifying the nature of the process itself.

From a preservationist's standpoint, it may be added that something could be done in theory to make these colour reproductions less ephemeral than we have suggested so far. The principle of the Technicolor process comes to the archivist's rescue: three black and white intermediate elements are created – each of them timed for one of the three primary colours – and then merged into a single-strip positive colour print. This processing technique, generally known as colour separation, produces archival elements whose stability is comparable to black and white material, and results in colour positive prints of excellent quality. It is an extremely expensive system, though, because three masters must be created instead of one. Moreover, colour separation from positive masters has serious drawbacks in relation to the processing stock required for making intermediate elements. The financial resources of film archives allow them to adopt this technique only on rare occasions for the preservation of colour negatives of sound films, almost exclusively in a commercial context.

4 *The surviving element is the nitrate negative print of a film that was originally tinted, toned, hand-coloured or stencilled.* In this case, tough luck. We are in a position of advantage in terms of image quality, especially if we are in presence of an original camera negative, as we are going to obtain prints of much sharper appearance than those we would get from average release prints. But we don't know what kind of tinting or toning was individually applied to the original prints made from the negative. Even when some written sources (such as scripts)

indicate the colours to be added, it is very difficult for us reliably to follow the instructions contained therein, as we have no exact idea of what kind of blue had to be used for a scene indicated as such in the script. We are of course tempted to guess, and if the document in our hands seems accurate, archivists may do so; but they do it at the risk of superimposing their own imagination upon an entity whose actual original appearance is not known. Things get even worse if the camera negative refers to a film that was originally coloured by stencil. It is possible that positive copies made from the negative reproduced in Plate 39 were originally coloured with mechanical means, yet the only evidence left to us is a black and white image which can only remain so unless a positive release print is found (in which case the negative is no longer needed).

So here we are, with a whole array of possibilities, a variety of techniques available to address them, and some aesthetic options, all more or less adequate but always questionable in theory. For each answer, several doubts arise. Are we doing the right thing with colour? Is it worth trying to reproduce it as faithfully as we can? Frustrating as it is, this challenge is one of the most exciting aspects of film preservation, as long as we keep in mind that all strategies are bound to clash with an inescapable truth. We are trying to imitate ancient colour on a modern object, and this object is not nitrate film. We also know that a colour dye looks different every time we apply it on a different film stock, and there is one thing we can't possibly do – create another nitrate print from the nitrate source. Nitrate stock has not been produced since 1951, and will never be manufactured again. Right now we are even at the threshold of a third era: manufacture of acetate film is being discontinued, and replaced by polyester. Once this film stock becomes the only one produced, those who try to restore films made in the acetate era will encounter the same kind of problems. While we're at it, let us make another leap of imagination, to the future time when the manufacture of film stock will be discontinued altogether. It will happen later than experts thought in the 1980s, but it will certainly happen. That will be an interesting time for film archives. We will return to this point at the end of the chapter.

### The Concept of Lacuna (I): What's Missing from the Image; or, Careful with that Axe, Eugenios

In all the situations we have considered so far, we have dealt with the print as it was when we found it. True, we have cleaned it, repaired the torn perforations, put the archival material in cold storage. Other than that, however, we have done nothing to the visual content of the film itself. In other words, we have not taken into consideration what will be further discussed in Chapter 6 – the fact that a silent film is never 'complete' in the abstract sense of the term. It is now time to deal with the concept of lacuna, and the ways to deal with it. Broadly speaking, there are two ways of looking at this issue. From a diachronic point of view – that is, from the point

of view of the sequential experience of several frames projected in rapid succession – print number 36 is 'incomplete' in the sense that we know that some footage that existed in the camera negative A is no longer there, and we assume that we would like to reintegrate the missing parts in the preserved object if we were given the opportunity to do so. From a synchronic point of view – that is, from the point of view of each frame taken as such – the image may be suffering from the ravages of time: the emulsion and the base are dirty, scratched because of wear and tear or careless handling and projection; colours have faded; parts of the emulsion have peeled off from the base; the image itself has been cropped during the various phases of duplication, including the stage where a soundtrack was added. Predictably enough, scratches have always been a primary focus of film preservation. They are, in fact, nothing but minuscule grooves on the film stock. If we cut a section of such film and look at it through a powerful magnifier, what we would see wouldn't be much different from this:

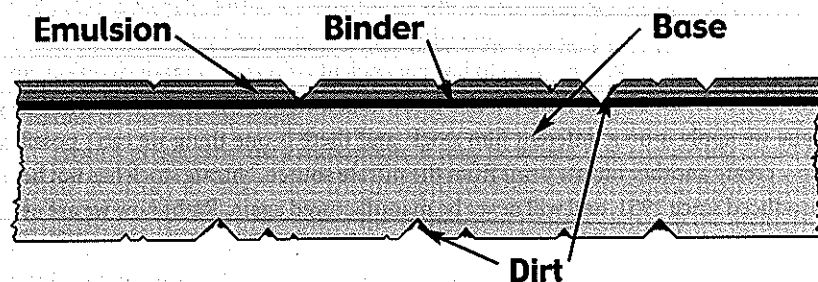


Figure 4: Section of a print with scratches on the base and emulsion sides.

Before going any further, it should be stressed that no matter where the scratches are, or what provoked them, there is nothing you can do about those which were made on prints of previous generations. If you find a pristine 16mm negative struck in 1935 from an appalling 35mm positive, nobody should blame you if your 16mm duplicate positive is less than perfect. (Viewers at festivals and symposia should be reminded of that every now and then.)

Scratches made on all non multi-layered positive prints (that means before Technicolor, where scratches may be visible in different colours because of the multiple emulsion layers) may appear as clear or dark lines on the screen.

*Scratches on the emulsion.* A portion of the visual information carried by the film has disappeared altogether and cannot be recovered with photomechanic means,

unless the scratch is extremely light. If the emulsion scratch is on the positive, it will appear as a clear line. If the scratch was made on the negative emulsion, the positive copy struck from it will make it appear as a dark line.

*Scratches on the base.* Instead of hitting the film perpendicularly, light from the projector encounters the base from different angles; its refraction provokes the impression of a dark line on the projected image. This impression is further aggravated by dirt increasingly deposited in the groove. After the dirt has been eliminated through various means of cleaning (ranging from basic manual intervention to chemical and ultrasonic cleaning, the latter being preferable because it is environmentally friendly, and does not involve any mechanical contact between the object and a cleaning agent), there are at least two ways of reducing or eliminating this effect. In the first method, generally known as 'light diffusion', the light source used in the printing process is directed from a variety of angles, so that the parts of the base affected by scratches are hit perpendicularly by as much light as the flat surface of the film stock. It is a very safe stratagem, as no chemicals are involved, but the image resulting from the duplication process tends to have less contrast than an average source print, and sometimes looks a little foggier than the original.

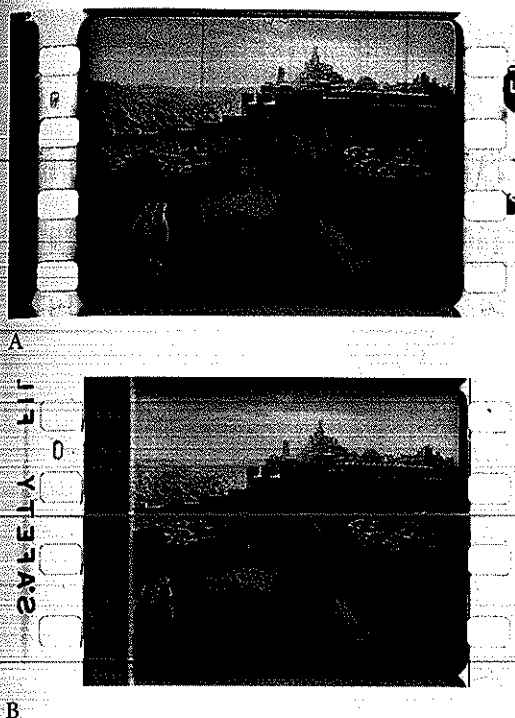
The second method requires a printing device where the optical gate is enclosed in a box filled with an extremely transparent liquid, so clear that it fills the scratches and makes the base surface appear as smooth as if there were no scratches at all, long enough for the light of the printer to go through it perpendicularly. The results produced by this system can be amazing, as the 'wet gate printing' is often able to make a badly scratched print look almost new. Unfortunately, most of the chemicals used for it are extremely harmful to the environment, and have become illegal in several countries. Laboratories are now trying hard to find safer substitutes. Despite this serious drawback, wet gate printing has dramatically improved the quality of the printing process and is widely considered a requisite for any serious restoration process.

Scratches can be eliminated in the duplication stage through a digital reconstruction of the missing part of the image: a computer scanner goes to the frame before or after the damaged one, identifies the part of the image affected by the scratch, retrieves the visual information on the 'clean' frame and copies it to the scratched frame. For the time being, digital reconstruction is a slow and expensive process. It can be applied to relatively modest portions of film, and has some disadvantages. Because of the cost involved, it cannot be applied on a large scale. Moreover, computers sometimes tend to take instructions too literally, thus altering parts of the frame that needed no alteration at all, such as the fleeting images of tiny birds in the sky mistaken by the electronic eye for grains of dirt and therefore eliminated from the frame. No doubt, this is no more than a technical limitation that is bound to be overcome with further developments of computer technology. The fact that a machine is being asked to replace a missing portion of



visual information with a virtual one is a wholly different matter, an ethical issue which involves broader philosophical questions. Is image enhancement a form of restoration? Do we have the right to make an image look better than it was originally? One example should stand for all. Many filmmakers working before 1908 had trouble in ensuring that the projected image would remain stable. Cameras and projectors were often producing and showing jittering images, and the matter was serious enough to become a discriminating factor in the film industry. (An Italian company born in 1908, Itala Film, used a trademark logo consisting of a veiled woman holding a light, the rays of which form an inscription – the French word 'fixité', signifying that the work presented by that company had a rock-steady image.) In restoring an early film with this kind of defect we are faced with another unanswerable question: should we reproduce image instability just as it was (because that's how people saw the film), or should we make it look stable, as if the problem never existed? One may argue that of course producers of the time would have loved to get rid of this flaw in the apparatus, and of course it would be better to see an early-Lubin-film that doesn't make us dizzy by its unpleasant shuddering. So we take care of the problem, as we now know how to do it, but in doing so we open ourselves to a whole range of objections. Early film producers would not only have preferred to see their images stable, but they would probably also, had they been able, have made them sharper, better contrasted, with even, hand-painted contours instead of those floating clouds on clothes and objects. How far are we willing to go in this exercise of wishful thinking? A limit must be set to our right to imagine their intentions, yet the boundaries of that limit are far from being well defined.

This is, again, a matter of choice and responsibility. On the other hand, there is not much of a choice to be made about a quite different kind of fault, caused not by cameras and printing machines but determined by human carelessness or deliberate action: the cropping of the image. If printing is not done with the necessary care, the edges of the frame can be mutilated on all sides. This occurs most visibly when a silent film is given a soundtrack whose area affects the left part of the frame, obliterating between 10 and 12 per cent of the visual content. The viewer is thus forced to look at an unbalanced shot, with people's right arms cut off, intertitles off-centre, and some heads closely shaved. There is obviously no way to reverse the loss: the only possible solution is to find a better print. We can now duplicate films without losing any portion of the image, and yet our culture seems so concerned with the power of the centre that the potential sacrifice of peripheral information doesn't seem such a big deal. Consider this in pictorial terms. If we don't care much about the framing of a Murnau film, what about a Rubens painting with the heads and feet of the figures partially cut off in order to repair the edges in a canvas? All available viewing copies of *Ben Hur* (Fred Niblo, 1925) are taken from printing elements with added soundtrack. Since the latest reissue of the film, a full aperture-fine-grain-master has been retrieved, but for the



*Ben-Hur* (Fred Niblo, 1925), 35mm positive prints of (A) the original release version and (B) the 1931 re-release with variable density soundtrack (George Eastman House).

time being this does not appear to anyone to be a sufficient reason for embarking on another restoration project on the film. The newly-found fine grain master is also of better quality, because it comes from a negative of an earlier generation, but so what? Untrained projectionists tend to crop the image anyway by using the wrong aperture gate, and as long as nobody protests or argues to the contrary, we will continue seeing this and other silent films a bit more incomplete than they already are. Viewing these films in electronic form is unlikely to make this a hot topic, so be prepared to be called a purist if you indulge in this kind of nit-picking argument.

Imagine, though, what would happen if all archives were to follow the example of director Hans Jürgen Syberberg. At the beginning of his *Parsifal* (1981) there is a caption with specific instructions to the projectionist, and a title surrounded by a thin white line whose meaning is more or less the following: if you don't see the lines at the edges of the frame, the film is not being projected properly (see overleaf). A projectionist in Athens got so humiliated and upset (the upper and bottom lines were not visible on the screen) that he took an axe and butchered the print after the show, but an average audience would just giggle if the lines didn't appear, and then accept the cropped image as it is; a more alert viewer would have every right to make a little fuss about it, although perhaps not as vehemently as the mad Greek technician.

Dieser Film ist im klassischen Normalformat  
gedreht (Vorführrmaske 1:1.33) und darf  
nicht auf Breitwand vorgeführt werden.

This film was shot on  
Academy format (aperture gate 1:1.33)  
and may not be shown on wide-screen.

Les prises de vue pour ce film ont été  
faites dans le format standard classique  
(cache d'aperture 1:1.33).

Il n'est pas autorisé de le projeter  
sur écran large.

Wenn obere und untere Linie sichtbar,  
sehen Sie das vollständige Bild.

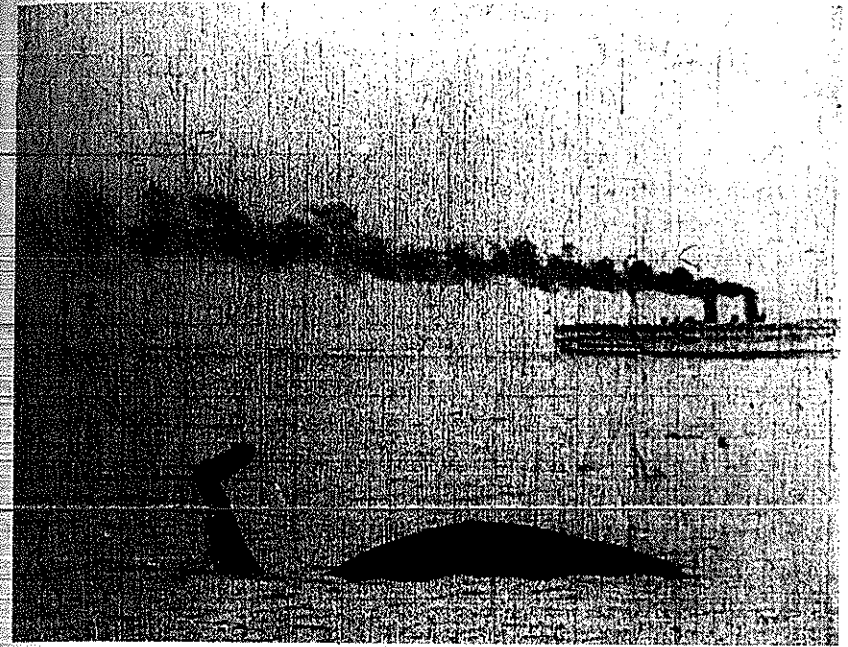
Full picture visible when upper and  
lower edges can be seen.

Si la ligne du haut et celle  
du bas sont visibles,  
vous voyez l'image complète.

### The Concept of Lacuna (II): What's Missing from the Story; or, What Price Completeness?

It is now time to go back again to Print 36 of our first diagram, and consider its 'incompleteness' from what we have called the diachronic point of view. Some sequential parts of the film are missing; that is, a portion of footage of what we assume must have been the complete print is absent altogether. It doesn't matter here whether the 'lost' portions of film are single frames, shots, sequences or entire reels. The fact is that a whole piece of the object is not there, and no laboratory technique is going to do us any good if we don't retrieve another print in a more complete shape. Contrary to what happens in the other arts, the viewer of a moving image doesn't like fragments. Looking at the Venus of Milo without arms is all right, but it doesn't seem all right to imagine *Casablanca* without the farewell scene. Whenever an important film that needs to be preserved is found in such an incomplete form, film archives inquire around fellow institutions in the hope that another print will help complete the puzzle. It is a frustrating search, and disappointment is far more frequent than success. Even in the latter case, the discovery of missing footage gives rise to more questions than answers. Let's now say that another print of our imaginary film is found, and we are swift in comparing it with Print 36. What

The opening credits of *Parsifal*  
(Hans-Jürgen Syberberg, 1981),  
35mm acetate print (courtesy of  
Hans-Jürgen Syberberg).



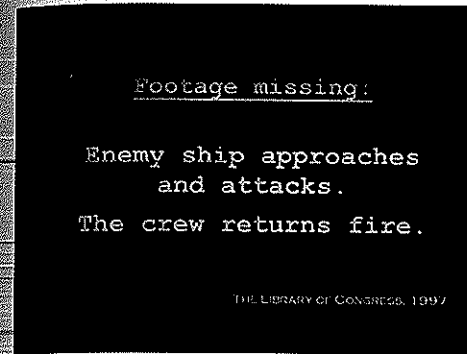
*The Lost World* (Harry O. Hoyt, 1925), 35mm acetate print (Národní Filmový Archiv, Prague).

if it's a print taken from a second negative, with shots taken at a slightly different angle? Do we have the right to incorporate it in the main footage? What if the print is of a much later generation than Print 36, and image quality is considerably worse than what is already in our hands? Are we going to insert the found part in our print anyway? That might help in figuring out what happened in the story of a fiction film, but it is also likely to bring a whole different set of disrupting effects. It all boils down to the question of what price we are ready to pay for the small victory we have gained on the narrative front. Image quality is only slightly inferior to Print 36, so we go ahead in the hope that the eventual viewer won't notice too much (in other words, we will play a little trick on our audience by using laboratory techniques in order to minimise the difference between the two sources). Alternatively, print quality is awful but the portion is too important to be left out, such as the last shot of *The Lost World* (Harry O. Hoyt, 1925), believed missing for many years and then found, but in desperate shape. Film preservationists have acquired a taste for adding footage at any cost to satisfy their concept of completeness, thus neglecting the significance of several dilemmas: if the recovery of the missing image matters so much, are we going to measure every single shot in the search for the print with one or two more frames? If these frames are found, are we going to add them to the main print even if the difference in quality will be obtrusive? Is it worth forcing the viewer

to become the coroner in charge of a morgue of the moving image? And does the act of collating different prints in order to create a new one deliberately disregard the very history which has brought the print to the state in which it has come down to us?

There is no single answer to any of these questions. Their solution lies in the mind of the preservationist, and is dependent upon individual judgement, a choice between a wide array of options. The paradox of a mutilated integrity is at the core of the principle of conservative restoration: we leave the film as it is, in the hope that its incomplete evidence will be appreciated as such by the educated viewer. Here's an interesting item in the agenda of film preservation for the years to come. In the 18th century ruins were given an aesthetic value not only because of the implicit memory of what had once been, but also because of the inherent beauty of the ruins themselves. Nothing of this kind is to be found in film culture today. An incomplete film is a museum object of lesser value, something that archives strive to preserve when they can, but only a few hard-core specialists are keen to watch. Some institutions have even declared that their primary goal is the preservation of complete films, thus giving up the crucial challenge of educating the viewer to the intrinsic value of a fragment as an entity with its own right to exist as such. Most of the early films made D.W. Griffith during the Biograph period (1908–13) survive in the form of paper prints (see p. 3) or as camera negatives without intertitles and with disassembled shots. There is of course a reason for their incomplete condition, and the state in which they were found and have come down to us is in itself historically relevant. The need to keep and preserve these sources in that state – which, in museum terms, is always the only sound choice – should not discourage the attempt to make them available in a form that enables us to understand their value (if this is at all possible; admittedly, that's not always the case with the Biograph shorts). In other words, we should be able to see each film as a coherent whole in order to appreciate, even by approximation, the role of these films in the culture of their time.

We are now getting used to the idea that when it comes to film preservation, no principle is absolutely right or completely wrong. Each has its virtues and flaws, depending on the perspective from which we consider it. This becomes all the more evident when we look at the counterpart of the conservative restoration principle discussed above. The opposite paradox – of a fictional completeness made out of a patchwork of ruins – is no less problematic, as it is the sign of a surrender to the authoritarian demands of the viewing pleasure and the market imperatives which exploit it. Other more drastic solutions are likely to exacerbate the problem. Have a look the illustration overleaf, taken from the Library of Congress's restoration of John Ford's *The Blue Eagle*, (1926), and consider its role in the viewing process. Those who preserved this film are telling us that some portions of it are missing, and provide as much information as possible about their content. Film historian Hervé Dumont attempted to explain what happened in the lost reels of Frank



*The Blue Eagle* (John Ford, 1926), 35mm acetate print. Archival title from the 1997 reconstructed version (Library of Congress, Washington DC).

Borzage's *The River* (1929) by inserting production stills in the surviving footage, a method more effectively implemented by Rick Schmidlin and Richard Koszarski in their 1999 recreation of the four-hour version of *Greed* (Erich von Stroheim, 1925). We now have a better understanding of its plots and themes (that's good news indeed, certainly enough to justify the efforts), but how much is this going to improve the aesthetic experience of the moving images which were left for us to see? How much are we willing to sacrifice to an unrestrained obsession for completeness? However perfectly logical in its rationale, the principle of integrative restoration (as applied to the moving image) may be pushed to unacceptable aberrations, such as beginning over again on the preservation of a film that probably is not in need of urgent care – an attempt, figuratively speaking, at reinventing the wheel. Projects of this kind can tell us more about the people who contrived them than about the films they are supposed to resurrect. True, restoration techniques improve with time. True, restoring a film cannot be considered as something that is done once and once only, and needs no further attention after the printing work is done. Unfortunately, these very good and often forceful reasons have been manipulated and twisted for the sake of far less compelling and sometimes highly questionable goals.

### A Very Concise Dictionary of Film Preservation

We may now have a better idea of how complicated and controversial the preservation of a silent film can be, but look how far we have progressed. We started with a single tree of possibilities (one print found among the many that could have survived), and we ended up being entangled in a network of alternative or conflicting options, a variety of possible print generation trees, and a whole set of cultural, financial, and political issues. The treatment of the copies retrieved or created during this intricate process has been described using terms too often used interchangeably, and it may now be the time to try defining them. Since you should not expect to find an overwhelming consensus on the matter, each definition ought to be considered more as a flexible conceptual framework than as a fixed, dogmatically imposed statement on how archival work should be implemented.

*PRESERVATION* is described in a film archive as the overall complex of procedures, principles, techniques and practices necessary for maintaining the integrity, restoring the content, and organising the intellectual experience of a moving image on a permanent basis. This seemingly vague definition is in fact the implicit acknowledgement of the three-fold purpose of the preservation work: making sure that the surviving artifact is not further damaged; bringing it back to a condition as close as possible to its original state; providing access to it, in a manner consistent with the way the artifact was meant to be exhibited. Outstanding laboratory work does not fulfil the above requirements if the film is then shown without regard to the projection speed or aspect ratio, or if the source copy is destroyed or abandoned after printing. Duplication, restoration, conservation, reconstruction (when necessary), access and exhibition in proper conditions are all constituent parts of the preservation activity.

*DUPLICATION* is the set of practices related to the creation of a replica of the moving image, either as a backup of existing original or preservation components, or as a means to give access to the moving image. While the duplication process is performed with the goal of obtaining a copy as close as possible to the source, such a process is a necessary but not sufficient requirement of a restoration project. The most accurate duplication (for example, a wet gate printing) may result in a satisfactory imitation of the source copy through the elimination of scratches and the removal of exterior agents such as dust, oil spots and dirt, yet – for better or worse – no further action is taken in order to bring the film back to its presumed original condition.

*CONSERVATION* involves all the activities necessary to prevent or minimise the process of physical degradation of the archival artifact, whether such an artifact is newly produced by the archive (a preservation negative) or is an already existing object acquired by the institution, with possible signs of damage or instability. An underlying principle of this process is that the above activities should be carried out with the minimum intervention or interference with the object. Storing a nitrate print in a vault equipped with temperature and humidity control systems is part of the conservation process.

*RESTORATION* is the set of technical, editorial and intellectual procedures aimed at compensating for the loss or degradation of the moving image artifact, thus bringing it back to a state as close as possible to its original condition. Removing alterations or manipulations detected on the artifact (in the reproduction process), retrieving elements missing from it (with reconstruction practices), and reversing the effects of time, wear and tear on the optical, chromatic, and (in the case of sound film) aural content of the motion picture carrier, are all components of the restoration work. Taken individually, none of them is sufficient to fulfil the requirements of a film restoration. The term 'restoration' in motion picture preservation is also different from its equivalent in most other disciplines, in the sense that it necessarily involves the reproduction of a source copy. We clean

a painting, treat the canvas, adjust the frame and fix unstable pigments, then we exhibit the painting itself. A nitrate film (and, for that matter, any known moving image carrier) may be cleaned, repaired, edited or treated otherwise. However, as long as it is the object of a preservation process (that is, if a decision has been made concerning its archival status), the artifact as such cannot be exhibited. Another distinctive feature of photographic moving images – comparable only to analog phonographic recordings on disc or tape – is that they cannot be experienced without progressively damaging them. Therefore, they must be duplicated onto another carrier whose eventual decay through wear and tear will not affect the possibility of providing access to their content through a new copy.

*RECONSTRUCTION* is the editorial process through which a print whose appearance is as close as possible to a desired version, considered as authoritative, is created by interpolating, replacing or reassembling segments within the copy and with footage retrieved from other copies. Some segments (such as intertitles) may be newly created by the archive. Because of its superficial resemblance to the critical edition of a manuscript or printed text, the practice underlying this method has sometimes been pretentiously mislabelled as 'philology', thus endorsing the reductionist implications of the term as applied to the moving image. In this respect, we should follow David Bordwell's advice, and reserve the term 'philology' for the interpretation of a literary work.

*RECREATION* is a strategy aimed at presenting an imaginary account of what the film would have been if some or all of its missing parts had survived. This course of action is taken when material directly or indirectly related to the film is used in order to give an idea of its original concept. While it is by no means a restoration, the 1999 version of *Greed* made for television (with a mixture of extant footage and production stills following Stroheim's script for the four-hour version) can be adequately described as a recreation. We will never know what the cinematic qualities of the film actually were, but at least we have a glimpse of its overall content.

It cannot be stressed enough that learning how a reconstruction project was accomplished, and sharing its criteria with future researchers and preservationists, is a duty that has only recently been properly recognised, but deserves the archivist's utmost attention.

#### RULE 2

Any decision taken in the preservation process must

- a) be reversible,
- b) prevent further deterioration or alteration of the original artifact, and
- c) be carefully documented.

Neither the above glossary nor the rule derived from its definitions includes terms such as 'digitised' and 'remastered', already mentioned in this chapter. These words may say something about what has been done to an electronic image obtained from a photographic film (and they may indeed be useful tools in a restoration project), but they are not operational criteria for film preservation. Don't be fooled by their indiscriminate use. The same applies to more traditional concepts. A poster for the 1989 re-release of *Lawrence of Arabia* says, 'restoration produced and reconstructed by Robert A. Harris and Jim Painten'. That doesn't mean much, either. Harris and Painten did a good job for the sake of a new commercial version of the film, but it looks as if the publicity department at Columbia was a bit confused by what they were trying to accomplish. How do you reconstruct a restoration? Or, did they mean that it was a restoration *and* a reconstruction?

The importance of using and not abusing the appropriate terms brings us to an important corollary. As much as film preservationists must make sure that their work is reversible (meaning that the source elements used in the restoration process are kept intact, or are treated in such a way that it is easy to return them to their editorial state preceding the reconstruction process), they also share the responsibility of explaining to others what they have done. Someone may ask why a certain decision was taken; other preservationists may want to do further work, and it will be very useful for them to be given all the information which their predecessors had at their disposal. Caring about what others are going to say or think about us and our philosophy of film preservation is a responsible way of thinking about the future. In all likelihood, our successors are going to question our action as much as we now question the decisions made by those who came before us. Why did we restore certain films and not others? Why did we use our funds for this print, and neglect that one? Why did we restore the films in a certain way and not otherwise?

One of the most difficult things we will have to explain to them is why we never had enough money to preserve everything we wanted. Working in a film archive is an exciting endeavour, but it is also a time-consuming, frustrating task where patience, method and perseverance are as important as creativity. Consider the following scenario, imaginary but totally plausible. One hundred prints in a film archive are in the process of severe decomposition, and we know all too well that they will soon disappear altogether if appropriate action is not taken promptly. We have enough money to save only ten of them, and the choice of which will survive and which will not is entirely in our hands. It is a cruel, thankless duty, similar to the situation of a doctor with a hospital full of dying patients and enough medicine to cure only a handful. Think of it. You are that doctor. How are you going to determine who will be cured and who won't? What will you tell them? How will you justify your actions to their descendants? That's exactly how a responsible film curator feels when reading the inspection reports. Film scholars who are unfamiliar with the museum world are often startled at the supposed indifference shown by the staff when they admit that a film has completely vanished. Their apparent

cold blood is not much different from a surgeon's unemotional stance in talking about a moribund human being. Once the film's cancer (be it nitrate decomposition, or the vinegar syndrome) has begun to spread, the preservationist is well aware of the moral challenge involved in deciding whether to salvage at least part of a film, or to let it die because others have to live. Such circumstances demand a remarkable sense of commitment towards posterity. Films will die anyway, but at least we must be fully conscious of why this daily tragedy occurs before our eyes.

The curator's choice will also shape the concept of history in years to come. We will tell future audiences that one film instead of another is worthy of their attention, and only we will know what other film was sacrificed in the name of our opinion. In the curator's defence, it should be added that the choice will also depend on what audiences ask film archives to do. A harsh truth of film culture is that audiences are often – perhaps generally – the most conservative players in the game. We want to see the masterpieces, the films that film history books have taught us to consider as cornerstones in the development of film style. We look for 'the best films ever made', we play with the lists of the 100 titles everybody should see. This immoral and nefarious exercise has become the staple of organisations whose mission should be the preservation of motion picture heritage. Its destructive consequences are obvious. Film culture becomes the equivalent of a tourist itinerary where a certain country is supposedly covered once all the main monuments have been seen. Been there, done that. Fundraising and marketing officers have taken over most of the institutional power in the archive, and now claim the decision-making authority once given to curators and programmers (unless they agree to become fundraisers themselves out of necessity, which is perhaps a lesser evil).

Less than 5 per cent of all the titles preserved in the average film archive is seen by scholars, and even less is requested by film festivals. Much of the remaining 95 per cent never leaves the shelves of the film vaults after preservation has been completed. Despite all the big talk about constantly rewriting the history of cinema and discussing its canons, we keep showing the same classics over and over again. One may say that younger generations have a right to see the great works we already take for granted, and that there's still a difference between a Buster Keaton of the golden years and an Eclair comedy, but that's not a valid reason to refuse them a chance to broaden their horizons. Is this what a film archive is for? A shelter for a privileged minority of cultural icons? A sanatorium for all the rest? An observatory of decomposing nitrate prints, or worse, a cemetery where archivists are paid for the sad duty of witnessing the progressive self-destruction of film history? Saving mummies of what's left, amongst the indifference of our time? Why bother spending fortunes for such an absurd task?

What makes things even more absurd is the fact that the archivist's idea of conservation as applied to the moving image is short-sighted from *force majeure*. Preservationists seem to be happy when a film is declared as saved for the next 100 years, but a century of cultural life is virtually nothing by comparison with the life of architecture and paintings. Let's put it another way: whenever we tackle a long-

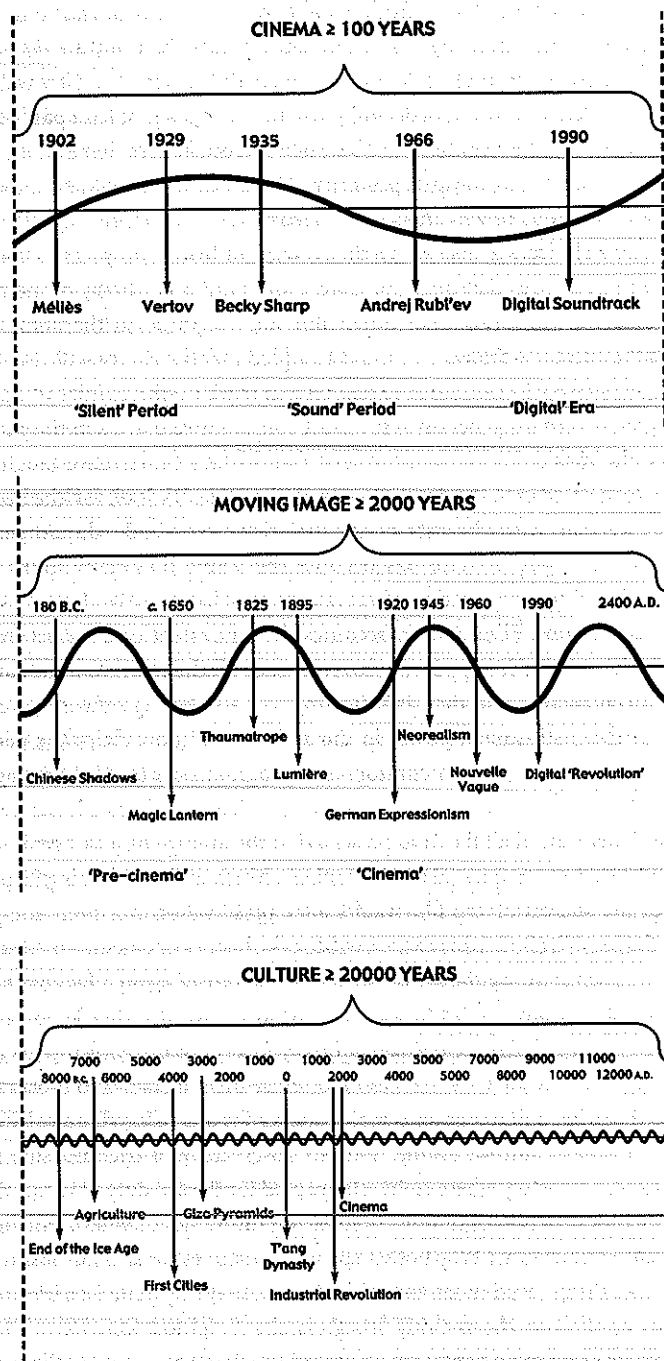


Figure 5: The moving image in history.

term preservation project, what do we mean by 'long-term'? Let's look at Figure 5, adapted from the 1996 manifesto of the Long Now Foundation. Seen from this perspective, a true long-term preservation strategy for cinema has yet to be found, and despite all the archival precautions implemented with great effort and debate we have made no real progress in this direction. We preserve film on film (as long as the industry will allow us to do so: it is still by far the most stable medium available at this time), and then see what happens. The future will be determined by the dictatorship of the moving image and entertainment industry. Let's not forget that manufacturers will eventually stop producing motion picture stock. At that point, film archives will be in big trouble. More visual history will be lost, more than ever (even things you thought were safe), despite the misleading promise of eternity delivered by the digital gospel. It is of course impossible to say now what carrier will bring our silent film heritage to the eyes of a spectator of the distant future, but we may fairly assume that such a carrier will be required to fulfil some basic requirements in order to make moving images visible 10,000 years from now. It ought to be a carrier whose actual use requires a hardware based on low technology. It also must be a carrier requiring a minimal amount of human maintenance in order to survive: a far cry from the costly refrigerated, low humidity vaults we are building now. Finally, it should be something that won't require much knowledge of twentieth-century technology in order to operate and experience. If we really want to make sense out of a lifetime spent in film preservation, we'd better come to grips with imagining the object (because it will also have to be an object: there's no getting over it) containing moving images that will be available to the viewer of the year 12000. In short: film preservationists of the world, let's add one digit to our calendar year. That's right, 10,000 more years. I see no good reason to settle for less than that.

### Further Reading

Research on moving image preservation has grown exponentially since the early 1980s in an exciting yet quite chaotic way, and has now reached the arena of daily newspapers, sometimes with questionable side effects. Writings on the struggle for film restoration, the search for hitherto lost treasures, and the efforts made to retrieve them and present them to modern audiences have grown to the status of a literary sub-genre and should soon become the object of a socio-cultural analysis. Such a spectacular surge, however, has not yet brought a systematic corpus of knowledge, and the following selected list of specialised studies on the subject should be seen as nothing but the provisional outcome of a collective work in progress often influenced by political and economic factors. The technology of moving image preservation is in itself undergoing a rapid progress, so swift that a text written only five or ten years ago may quickly be superseded by further progress in the field. A comprehensive bibliography of texts in English is available at the website of the American Film Institute: [www.afionline.org/preservation/about/bib.html](http://www.afionline.org/preservation/about/bib.html).

### Introductory Texts

If I had to choose a text to be used as a very first reading on the subject, I would have no hesitation in selecting Eileen Bowser, 'Some Principles of Film Restoration', *Griffithiana*, vol. 11 nos 38–9, October 1990, pp. 170–3. *A Manual for Film Archives*, edited by Eileen Bowser and John Kuiper (Brussels: FIAF, 1980; New York and London: Garland, 1991) is still a basic reference tool for those who wish to enter the arena of film preservation, and a useful *aide-mémoire* for more experienced professionals. *Audiovisual Archives: A Practical Reader*, edited by Helen P. Harrison (Paris: UNESCO, 1997) is also highly recommended. A guide to archival terminology is Günter Schulz and Hans Karnstädt (eds), *Terms and Methods for Technical Archiving of Audiovisual Materials* (Munich-New York-Paris: K.G. Saur, 1992). Tom McGreevey and Joanne L. Yeck, *Our Film Heritage* (New Brunswick, NJ, and London: Rutgers University Press, 1997) is a general overview of film preservation in the United States. See also Eva Orbanz (ed.), *Archiving the Audio-Visual Heritage: A Joint Technical Symposium* (Berlin: Stiftung Deutsche Kinemathek, 1987); *Guide de la conservation des films* (Paris: Commission Supérieure Technique de l'Image et du Son, 1995); Ralph N. Sargent, *Preserving the Moving Image* (Washington, DC: Corporation for Public Broadcasting/National Endowment for the Arts, 1974); Ramon Espelt (ed.), *Protection and Preservation of Films* (Barcelona: Oficina Catalana de Cinema, 1988); Chen Jingliang (gen. ed.), *A Collection of Papers Presented at the Symposium on Film Collections in Asia* (Beijing: China Film Archive, 1997); *Film Mutilation and How to Prevent It* (Rochester, NY: Eastman Kodak Company, 1924), reproduced at the end of this volume in Appendix 6. *The Book of Film Care* (Rochester, NY: Eastman Kodak Company, 1983), written from the viewpoint of a major film stock manufacturer, is a practical guide for the non-specialist, filled with odd comparisons ('a film roll may seem like a stubborn horse that resorts to distending its flanks to avoid the solid seating of the saddle by whatever tugging of the cinch strap', p. 68) and empirical evidence which has been refined by further laboratory research. The recommendation that 'when nitrate base negatives have been duplicated, they should be destroyed' (p. 45) is aberrant by today's standards, yet reflects an opinion that was quite common at the time.

### Theory

The only comprehensive study on the subject has been written by Ray Edmondson, *A Philosophy of Film Archiving* (Paris: UNESCO, 1998), a landmark in the discipline of moving image archiving. See also *Film Preservation and Film Scholarship*, special issue of *Film History*, vol. 7 no. 3, Autumn 1995; the *FIAF Code of Ethics* (Brussels: FIAF, 1998); Paolo Cherchi Usai, 'Decay Cinema: History and Aesthetics of Moving Image Destruction', *Stanford Humanities Journal*, Fall 1999; revised and expanded versions have been published in Italian, *L'ultimo spettatore. Sulla distruzione del cinema* (Milan: Editrice Il Castoro, 1999) and in English, *The Death of Cinema* (London: BFI Publishing, 2001). While not dealing at all with film, Nicholas Stanley Price, M.

Kirby Talley, Jr., and Alessandra Melucco Vaccaro (eds), *Historical and Philosophical Issues in the Conservation of Cultural Heritage* (Los Angeles: The Getty Conservation Institute, 1996) is a treasure trove of ideas which are quite pertinent to the preservation of the moving image. The institutional gap between preservation in film and the other arts is a lamentable reality which no individual or collective effort has yet managed to overcome; the responsibility of addressing this critical question is now in the hands of a new generation of specialists, but no solution seems to be in sight. A meticulous reading of art historian Cesare Brandi *Teoria del restauro* (Rome: Edizioni di Storia e Letteratura, 1963; reprint Turin: Einaudi, 1977; partial translation in Price, Talley and Melucco Vaccaro, *Historical and Philosophical Issues*) will provide a wealth of insights into most of the controversies related to the topic. Other required readings for the moving image preservationist of the future should be Steward Brand, *The Clock of the Long Now. Time and Responsibility* (New York: Basic Books, 1999), and Peter Schwartz, *The Art of the Long View. Planning for the Future in an Uncertain World* (New York: Doubleday, 1991). Figure 5 is a modified version of the diagram by Stewart Brand and Brian Eno which appeared on the website of the Long Now Foundation ([www.longnow.org](http://www.longnow.org)).

### Documentation

An outstanding example of how a preservation project may result in a catalogue of holdings is provided by Roland Cosandey in *Film um 1910*, an analysis of the Joseph Joye Collection held by the National Film and Television Archive in London (Stroemfeld/Roter Stern/Stadtkino Basel, 1993); see also his *Cinéma 1900. Trente films dans une boîte à chaussures* (Lausanne: Payot, 1996). Another corpus of early films, the Jean Desmet collection, is discussed in Ivo Blom, *Pionierswerk. Jean Desmet en de vroege Nederlandse filmhandel en bioscoopexploitatie, 1907–1916* (Amsterdam: Amsterdam University Press, 2001). A promotional approach to the subject is offered by *The Lumiere Project. The European Film Archives at the Crossroads*, edited by Catherine A. Surowiec (Lisbon: Associação Projecto Lumiere, 1996). A much broader range of questions on the rationale of film preservation is presented in the massive report presented by the Librarian of Congress under the title *Film Preservation 1993: A Study of the Current State of American Film Preservation* (Washington, DC: US Government Printing Office, 1993, four vols in three tomes), integrated by *Redefining Film Preservation: A National Plan*, coordinated by Annette Melville and Scott Simmon (Washington, DC: Library of Congress, 1994). The discovery and preservation of the Dawson City Collection referred to on page 44 is described by Sam Kula, 'There's Film in Them Thar Hills!', *American Film*, vol. 4 no. 8, July–August 1979, pp. 14–18.

### Films, Video and Electronic Media on Film Preservation

A charming short film on motion picture preservation and history (set in 1999!) was produced by MGM when nitrate film was still in production: *Forgotten Treasure*

(Sammy Lee, 1943, 10'). Over the years, film archives have produced video works as introductions to moving image preservation. Among them are Orly Yadin, *The Work of a Film Archive* (Flashback Television Ltd, 1992, 27'13'', VHS PAL); Scott Benson, *The Race to Save 100 Years* (Warner Bros./Turner Entertainment, 1997, VHS NTSC, 55'57''); Jacques Mény, *Sauver les films. Une mémoire pour demain* (Sodaperaga/Centre National de la Cinématographie/Ministère de la Culture et de la Communication, France 1991, VHS Secam, 33'); from the same director, *À la recherche des films perdus* and *La Mémoire retrouvée* (Online Productions/La Sept/ARTE, 1996, VHS PAL, 75' and 63'); Mark McLaughlin, *Keepers of the Frame* (WinStar Cinema/Mount Pilot Productions, 1999, 16mm, 70').

### Technical Literature

The International Federation of Film Archives (FIAF) has published over the years a large corpus of studies in this area. Among them are the *Technical Manual of the FIAF Preservation Commission* (Brussels: FIAF, 1993); *Handling, Storage and Transport of Cellulose Nitrate Film* and *Preservation and Restoration of Moving Images and Sound*, published respectively in 1992 and 1986. Spanish archivist Alfonso del Amo García is the author of a remarkable manual, *Inspección técnica de materiales en el archivo de una filmoteca* (Madrid: Filmoteca Española, 1996). The volume has been translated into English and Italian (*Technical Inspection of Motion Picture Film in the Archive*) by the L. Jeffrey Selznick School of Film Preservation (Gemona and Rochester, NY: Cineteca del Friuli/George Eastman House, 2001). The same series includes two very detailed accounts of the structure, chemistry and identification of motion picture film stock: Luis Fernández Colourado, Rosa Cardona Arau, Jennifer Gallego Christensen and Encarnación Rus Aguilar, *Los soportes de la cinematografía 1*; Fernando Catalina and Alfonso del Amo García, *Los soportes de la cinematografía 2* (Madrid: Filmoteca Española, both published in 1999. Volume 2 is in Spanish and English). See also Mark-Paul Meyer and Paul Read, *Restoration of Motion Picture Film* (Newton, MA: Butterworth-Heinemann, 2000); James M. Reilly, Peter Z. Adelstein and Douglas W. Nishimura, *Preservation of Safety Film* (Rochester, NY: Image Permanence Institute/Rochester Institute of Technology, 1991); James M. Reilly, Peter Z. Adelstein, Douglas W. Nishimura, and Catherine Erbland, *New Approaches to Safety Film Preservation* (1994); Jean-Louis Bigourdan and James M. Reilly, *Environment and Enclosures in Film Preservation* (1997); *Il cinema ritrovato. Teoria e metodologia del restauro cinematografico*, edited by Gian Luca Farinelli and Nicola Mazzanti (Bologna: Grafis, 1994). Despite the convoluted style and jargon-filled language, their article 'Black on White. Notes on Film Restoration: The Reconstruction', co-authored with Michele Canosa in *Cinegrafie* 10 (Ancona: Transeuropa, 1997, pp. 191–202) is a worthwhile addition to the book. On the same topic, see Roland Cosandey, 'Fac-similé non dissimulé: l'édition ordinaire du cinéma (Boolsky, Guillaume Tell, Eisenstein)' in *CinémAction* (Paris), no. 97, October 2000. Colour preservation is discussed in *The Preservation and Restoration of*

*Colour and Sound in Films* (Brussels: FIAF, 1981); *All the Colours of the World. Colours in Early Mass Media, 1900–1930* (Reggio Emilia: Edizioni Diabasis, 1998). For a history of film preservation techniques until 1985, see the bibliography in *Film da salvare. Guida al restauro e alla conservazione*, special issue of *Comunicazione di massa*, vol. 5 no. 3, September–December 1985. Issues of digital restoration are discussed in *The Use of New Technologies Applied to Film Restoration: Technical and Ethical Problems* (Gamma Group [no place of publication, no date, ca. 1994]).

### Journals

Reports and discussions on film preservation projects appear in the *Journal of Film Preservation* (produced under the title *FIAF Bulletin* from issue 1 to 46), published twice a year by the International Federation of Film Archives, and in *Moving Images*, distributed for AMIA by the University of Minnesota Press. Essays and notes also appear regularly in the *AMIA Newsletter* (Los Angeles: Association of Moving Image Archivists, 1988–seqq.), *Cinegrafie*, the 'Archival Notes' section of *Cinema Journal* and, occasionally, in *Griffithiana*, *Kintop*, *Film History* and *1895*.

### Associations

In addition to the International Federation of Film Archives (1 rue Defacqz, 1000 Brussels, Belgium), representing non-profit moving image archives worldwide (their names and addresses are listed in Appendix 2), a number of regional groups are active in specific areas: in Europe, the Association des Cinémathèques Européennes; in Central and South America, the Coordinadora Latinoamericana de Archivos de Imágenes en Movimiento (CLAIM); in Australasia, the South East Asia-Pacific Audio Visual Archive Association (SEAPAVAA, c/o Ms. Belina Capul, Philippine Information Agency, Visayas Avenue, Quezon City, Metro Manila, Philippines. Fax +63 2 920 4395); in North America, the Council of North American Film Archives (CNAFA). While operating in the United States, the Association of Moving Image Archivists (AMIA) has no inherent geographic boundaries. So far, AMIA is also the only association based on individual membership. Anyone interested in moving image preservation can join the group.

### Archival Training

At the time of writing, several institutions provide archival training on a more or less systematic basis. The L. Jeffrey Selznick School of Film Preservation at George Eastman House is the first permanent programme (one academic year for each course) covering all aspects of museum work, with a strong accent on hands-on experience with nitrate print inspection, film programming, and management (website: [www.eastman.org](http://www.eastman.org)). The seminars held by Archimedia in the European Union take place in several institutions on a rotation basis, and are mainly aimed at an audience from the academic and professional world (website: <http://europa.eu.int/comm/dg10/avpolicy/media/en/archim>). The University of East Anglia has a Film



Studies/Film Archiving program in conjunction with the East Anglia Film Archive (website: [www.uea.ac.uk/eafa/](http://www.uea.ac.uk/eafa/)). The University of California in Los Angeles has classes, seminars and workshops in archival training held in the context of the Cinema Studies graduate program (website: [www.ucla.edu](http://www.ucla.edu)). The University of New South Wales in Australia has organised an internet course in audiovisual management in cooperation with National Film and Sound Archive/ScreenSound Australia (website: [www.silas.unsw.edu.au/silas/distedu.htm](http://www.silas.unsw.edu.au/silas/distedu.htm)). A similar project, Film Archives On Line – limited to the laboratory aspect of film restoration – is now being prepared in the European Union (website: [www2.iperbole.bologna.it/faol/](http://www2.iperbole.bologna.it/faol/)). By and large, the advantages and disadvantages of training courses held through electronic media are obvious: they offer extensive and often invaluable information on the subject, yet are lacking the direct contact with film, which is at the core of the archival experience. Those who don't have the time or the financial resources necessary to attend any of these courses have some alternatives. The International Federation of Film Archives runs a three- or four-week Summer School every three to four years (website: [www.cinema.ucla.edu/IFAF/fiaf.html](http://www.cinema.ucla.edu/IFAF/fiaf.html)), mainly for the benefit of staff members of IFAF and FIAT (International Federation of Television Archives). One-day seminars are held at the annual conference of the Association of Moving Image Archivists organised in different locations of North America (website: [www.amianet.org](http://www.amianet.org)). In Australasia, SEAPAVAA periodically offers workshops to its members (website: [www.seapavaa.virtualave.net](http://www.seapavaa.virtualave.net)).

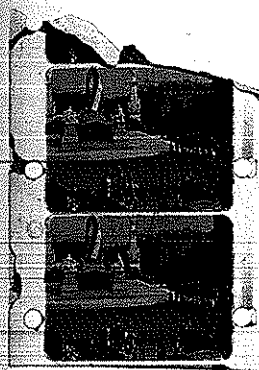


PLATE 1  
Cinématographe Lumière.  
*Inauguration par Guillaume II  
du monument de Guillaume Ier*  
(September 4, 1896); Lumière  
Catalogue no. 221. 35mm  
nitrate print with one round  
perforation on each side of the  
frame (Author's collection).

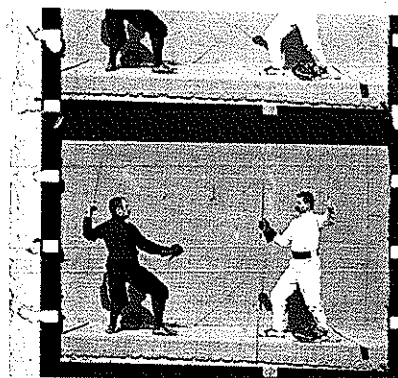


PLATE 2  
Georges Demeny. Unidentified film (1896),  
58mm nitrate print. The inscription '*Avant  
l'assaut - Le mur*', handwritten on the  
negative, is visible on the leader of the  
positive copy (George Eastman House).

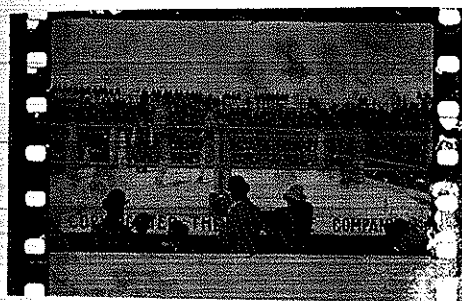


PLATE 3  
Veriscope. *The Corbett-  
Fitzsimmons Fight* (1897), 63mm  
nitrate print (George Eastman  
House).



PLATE 4  
Duplex, 1915-27.  
Unidentified film,  
11mm positive print  
(George Eastman  
House).

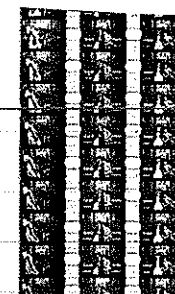


PLATE 5  
Edison Home  
Kinetoscope.  
Unidentified film,  
22mm diacetate print  
(George Eastman  
House).