

The Restoration Business Part One: No Restoration Without Conservation

Grant Lobban

The traditional view

It wasn't so long ago, that the term "film restoration" conjured up an image of dedicated archivists engaged in a race against time to save our cinema heritage by repairing and copying old nitrate films before they literally self-destruct. Also brought to mind are major restorations like Kevin Brownlow's passion, which lasted almost a quarter of a century, for reconstructing Abel Gance's silent epic *Napoleon* (1927). He, and other film historians, are continuing their work to bring back to life other classics of the silent screen for modern audiences to enjoy and appreciate.

Not always so old

These days, however, there are few re-issues of even relatively recent films, both at the cinema and on video, which don't boast the use of a "newly restored print", with the latter also digitally remastered for good measure. Many potential customers may have been surprised that films like *Lawrence of Arabia*, *Spartacus* and *My Fair Lady*, had to be restored, and wondered why such important and popular films were not looked after properly in the first place.

How permanent?

In a world of ever changing video formats, film is often quoted as the ideal mastering medium, and praised for its permanence and long-term protection. However, those of us who handle and work with film, both old and new, know how fragile and vulnerable it can actually be.

It started on celluloid

It's now a well known fact that for

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the first 50 years, the professional cinema was in reality a wonderful world of celluloid, using films with a cellulose-nitrate base. "Nitrate" films are not only highly inflammable, but will eventually decompose. The life of nitrate film was estimated to be around 50 years, so its use was not a problem, when in current use and in good condition. Some cheap kinds of stock made using wood cellulose, rather than the usual cotton, broke down first, lasting only ten or twenty years. This stock was often chosen for prints with only a short working life, such as newsreels and topical shorts. Many of these, which are now long gone, would have been of great historical value. Of the other nitrate films, most have already disintegrated, and the life of those which remain is hard to predict. For example the Imperial War Museum once had over 1000 nitrate based films, dating from the First World War. Today, less than 50 still survive, the rest decomposing during the 1950s and 1960s. When its time comes, nitrate film destroys itself, and once started, the process of decay can't be halted. Even if previously copied, it is still a heartbreaking experience, as the quality of the images can rarely be replicated. It's also a nasty business. First the film becomes sticky, before rapidly turning into a gluey congealed mess, then finally to brown powder. While this is all happening, the decaying film gives off dangerous and explosive gasses. In the interests of health and safety, if any of the early signs of the film's demise are detected, then it must immediately be put out of its misery and destroyed.

Safety first

When nitrate film was the industry's normal "stock in trade", it was handled and run without any concern. Cinemas were licensed and inspected by the authorities to ensure that the

safety regulations, designed to protect both the staff and the audience, were observed. The projection room rules included a separate rewind area, plus automatic fire-proof safety shutters on the portholes to stop any fire, or sign of it, reaching the audience. The projectors had to have enclosed spool boxes, complete with fire traps. Trip switches in the film path shut-down the machines in the event of fire. Projectors continued to be supplied with many of these design features, long after nitrate prints had been discontinued, right up to the long-play revolution in the 1980s. Nowadays, nitrate film has gained such a reputation, that some new projectionists starting work in the few specialized theatres still equipped and licensed to run it, (like the N.F.T.), often feel nervous during their first show, like being trapped in a room with an unexploded bomb. I can remember my own final "official" nitrate show at the BBC's last nitrate-equipped preview theatre at Lime Grove studios. The sense of danger was heightened when the film was delivered complete with its own BBC fireman, holding a fire extinguisher in one hand, and a bucket of sand in the other. All survived the event and enjoyed the showing of a beautiful Technicolor nitrate print of *Saraband For Dead Lovers* (1948), before the theatre was closed down and eventually demolished, along with the studio.

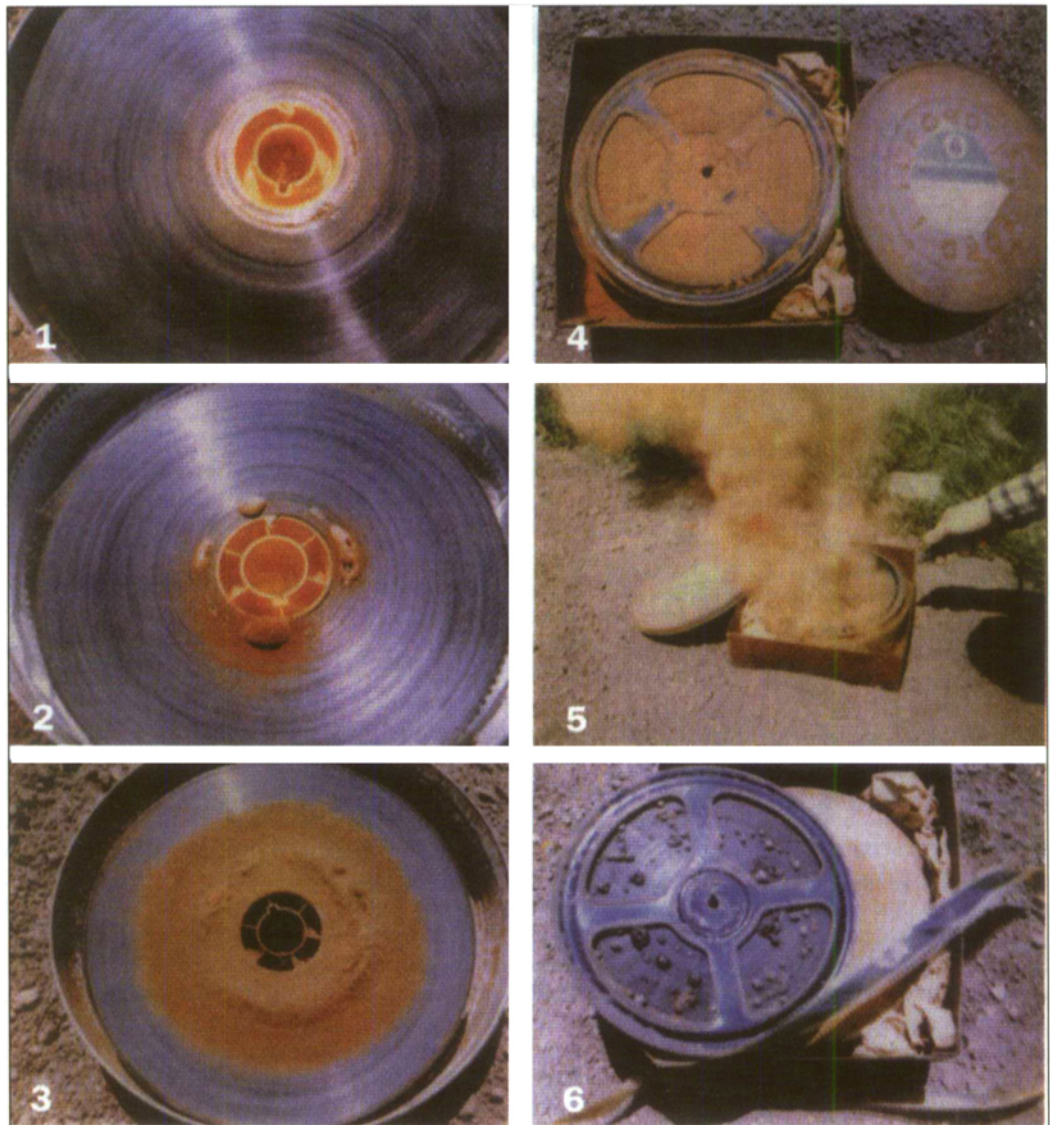
Why did it take so long?

Why did the industry continue to use such a hazardous substance for so long? A "Safety" slow-burning cellulose-acetate stock was introduced in 1908 for the Kodak roll film still camera. It was subsequently made available for motion picture work in the 1920s. However, at the time, safety film wasn't as strong, flexible or transparent as nitrate, so it was only adopted for 16mm, 9.5mm, and later 8mm

films, in order to make life less hazardous for amateurs. Acetate also cost more, so why pay extra for prints which only lasted half as long. It was not until 1950 that an improved tri-acetate base was introduced which matched the physical characteristics of nitrate. From 1951, the change to safety film was rapid and since then, most nitrate films, particularly those with any commercial value, have been copied onto acetate stock, most of them long before they came up to the end of their life. The arrival of television helped speed up the re-printing process, as many safety prints were needed for broadcast directly from telecine.

Safe but not permanent

Another advantage of safety film was said to be its longer life, sometimes even described as "permanent". Unfortunately, the passage of time has shown that acetate film also has its own process of decay. It's known as the "vinegar syndrome", named after the smell of the acidic fumes given off by the film during its own road to ruin. This makes the base increasingly brittle which, if left untreated, will eventually crumble to dust. The condition was first noticed during the 1960s, with one of the first complaints to Kodak coming from the Government of India, who's films were stored without any protection from the hot humid climate. By the 1980s, the condition had become a general problem, striking first at magnetic tracks and striped prints. Unlike the decay of nitrate, the vinegar syndrome, if caught early, can be arrested. The search for a cure, or at least a method to slow down the process, has



Pictures of Nitrate film – Going, going, gone! 1. Centre of the roll becoming tacky, with adjacent layers of film often sticking together. 2. Centre of the roll sticky and blistered, with brown powder beginning to appear. In both the above cases, if the unaffected outer parts of the rolls are isolated immediately, they can be saved for long enough to be copied. 3. Roll disintegrating to acrid brown powder. 4. Can opened after 35 years. 5. Powder being blown away. 6. To reveal a spool full of a solid congealed mass of unsavable film.

resulted in a number of proprietary procedures. These include chemical treatment to the film itself, or a packet of chemicals stored along with the film in the can. This acts as a sponge to absorb moisture and harmful contaminants released by the film. Plastic "vented" cans or alkaline-buffered cardboard boxes are also available to help get rid of the fumes. Protecting large collections can be a very expensive business. Those of us with smaller collections and who have begun to notice a smell of vinegar coming from

under the bed, may like to try one old archivists' wives tale and put a sprig of mint from the garden in each can. I'm told it seems to work!

Nitrate can last 100 years

It now appears that the best surviving nitrate stock, when properly stored in the cool and dry, has a much longer life than was previously expected. Some of the early nitrate based films, which were kept after being copied, have actually outlasted the acetate copies originally made to save them.

Some films, dating from the birth of motion pictures and now over 100 years old, are still in reasonable condition, while the camera negative of the last major American feature photographed on nitrate stock, *Sunset Boulevard* (1950), has started to decompose. Another dramatic example of the staying power of early nitrate films, was a collection buried, when the mining town of Dawson City in northern Canada was abandoned in 1928. When the films were dug up out of the permafrost in 1978, they were in excellent condition. One related use of nitrate film was for early cartoon "cells", before they too changed over to acetate sheets. Today, some collectors pay thousands of pounds for early examples, showing great faith in the future condition of their celluloid investment.

Polyester problems?

We are now told that the modern answer to "permanence" is a change to a polyester base, with a life of between five and ten times longer than acetate. However, in the years to come what currently unknown affliction may also strike this kind of base? The emulsion is already coming unstuck from some of the first polyester films.

Food for fungus

On whatever kind of base, the film's emulsion, with its silver black and white, or coloured dye images, is also at risk. It's very much an organic substance made up largely of gelatine. In the right warm and damp storage conditions (or should it be wrong), it makes the ideal food for various creepy-crawlies, fungus, mould and bacteria. Although the invaders rarely destroy the film's images completely, their waste products leave spots and blotches, which are often hard to remove or disguise. If the emulsion is discovered to be "alive", the unwelcome visitors can be dealt with, using a dose of fungicide, or even killed off by being irradiated with gamma rays.

Terrible tales

Films are not always safe, even in the cool and dry of a well protected

"vault". There are few of these, at studios, libraries and laboratories, which have not at one time or another, suffered a fire, flood, or even an earthquake. Such disasters continue to happen. On a hot summer's day in 1978, a fire at the International Museum of Photography at George Eastman House in Rochester, New York, nearly destroyed the original nitrate negatives of *Gone With the Wind*. It was blamed on spontaneous combustion inside a nitrate store, which didn't have any temperature or humidity control, or even any proper fire detection or control equipment. Unfortunately, The disaster did claim the negatives of another 327 features and short films, plus a number of early cartoons. Nearer to home, on the hottest day of 1993, a similar fire started in the vaults at Hendersons, a south London laboratory specializing in printing old black and white films. After it was all over, we had to say goodbye to the original negatives of such British classics as *Whisky Galore*, *Passport to Pimlico* and *The Belles of St Trinian's*. Of course, in both cases, none of the most important films were at any risk of being lost completely. The first rule of conservation dictates that duplicate negatives and other pre-print materials are always kept at other locations. Also, there are still many good quality prints around of the most popular films. At greater risk from these catastrophes, are the lesser known films, with no back-up material readily available.

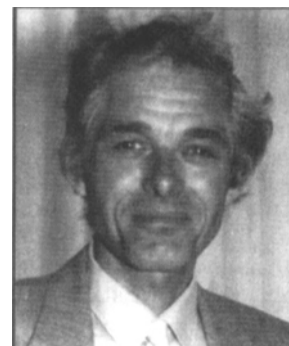
Human destruction

Although at risk from acts of God, the greatest danger comes from the decisions and actions of man. It is estimated that, of all the films produced before 1950, only a half are still in existence, with the proportion rising to three-quarters lost from the silent era. When sound arrived in the late 1920s, silent films were considered to be worthless. Millions of feet were destroyed, sold off to junk merchants for the price of their silver content. Even the celluloid was "melted down" and turned into patent leather shoes and handbags. Apart from deliberate actions, many of the films, particularly

the less popular and well known, have been lost by simple neglect.

After a film's negatives and other pre-print material had served its purpose making the release prints and sometimes 16mm reduction prints for the non-theatrical market, the rolls of film were put on the shelf and forgotten. In the years to come, although the film inside remained in excellent condition, just the sight of the rusted cans with their faded labels was enough to invite the film to be junked, if orders came from the top to make room on the shelves. This was far more likely to happen in the years before the coming of television and later earnings from the release of films on video cassettes and the ever hungry satellite channels. At the other end of the scale, even the successful blockbusters, with many re-issues in cinemas, were in danger of suffering from over work, with the negatives ending up worn out and damaged, by being required to make too many prints.

THE AUTHOR



Grant Lobban, who spent 30 years with the BBC as a studio projectionist and sound recordist, is now a Retired Fellow of the BKSTS.

Grant is an enthusiastic "technical" historian of the cinema, and is well known for his major contributions to the BKSTS Wallcharts. He has also written many articles for *Image Technology* and *Cinema Technology* over the years. His recent series on drive-in movies led to correspondence from all parts of the world.