

Projection Practices and Showmanship

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I. Introduction

Several months ago I submitted a comprehensive tutorial on building a home theatre to Film Collectors List Server in the hope that it might inspire the faint of heart and guide them to create a real home *movie* theatre suited to their needs. At the end of that tutorial I asked if there was any interest in a similar treatise on the subject of *operating* a home film theatre, or any other type of film theatre for that matter.

The responses were positive, so I am again seated at the computer searching for the right words, though this time I am joined by Tim Dulin, a long time projectionist (including Imax) and theatre service technician, who still works from time to time as projectionist in Hollywood luminaries' private screening rooms (most of which are changeover booths), as well as in a major Southern California performing arts center that hosts frequent film festivals.

My background includes the old school (the 1950s through the 1970s), while Tim's includes today's school (mid 1980s through today) and state-of-the-art special venue applications, as well as new theatre installations and start-ups.

II. Prior Reading

This tutorial assumes you are now in charge of a booth, be it your own, a friend's or in a commercial or retrospective cinema, and that you have read the previous material ("Collecting Basics" and "Build a Home Theatre"). It also assumes you have made the acquaintance of a technician upon whom you can call when needed.

As a start, we recommend you go to www.film-tech.com and click on "Manuals," and scroll to Instructional Documents to find "Projectionist Study Material." This material, apparently Canadian in origin, seems to be derived from either a study syllabus or a projectionist's test, but it comprises an excellent introduction if one aspires to become a projectionist! Download it and consume it. Also, while on "Manuals," scroll to Eastman Kodak's Film Notes (a wealth of information). Download them also and learn.

Another excellent resource is the SMPTE "Projection Manual." It may be ordered on-line at www.smppte.org, and, while the non-member price may seem steep at \$135, it is a valuable reference book. It is in two sections, the first being the BKSTS (British Kinematograph Sound & Television Society) step-by-step projection tutorial, and the second being a series of articles authored by U. S. experts in cinema technology that augments the British tutorial with additional information on U. S. projection practices. It would make a valuable addition to your booth technical library.

The good people at Kodak have a new training center in Culver City (near Los Angeles,

CA) and offer two-day interactive seminars with hands-on projectionist training in film handling, trouble shooting and maintenance, all this in a state-of-the-art facility that simulates a typical multiplex projection booth. If this sounds interesting, contact james.ferguson@kodak.com. The present cost is \$250/day/person. "Nobody knows more about pictures than Kodak." Additionally, Kodak produces the valuable Film Notes (also called Cinema Notes) and a wall chart size Projection Trouble Shooting Guide. If you attend a Kodak seminar you will probably go home with a copy.

Also, in "Collecting Basics," reference was made to F. H. Richardson's venerable "Bluebook of Projection." We had earlier acquired copies of the Fifth Edition (1927) and the Sixth Edition (1935), and most recently we purchased a copy of the Seventh (and last) Edition (fifth printing, 1948). If you aspire to become a real projectionist, we can make no better recommendation than you secure a copy of Richardson (7th Edition preferably) for your personal library. (Try www.bibliofind.com and enter Bluebook of Projection [title] and F. H. Richardson [author], and sit back and wait while the wonderful world of the Internet searches for you.) With every reading of Richardson you will learn more and more. Some may liken this to devouring a Ford Model A service manual prior to tuning up a '98 Chevy, but much of the theory of operation is the same and entirely timeless, and the historical perspectives gained are priceless.

Finally, by utilizing the excellent resources of www.film-center.com and www.film-tech.com, by networking with other projectionists, technicians and home theatre owners, and by studying excellent reference books like the SMPTE manual and Richardson, and perhaps even by attending a Kodak seminar, you will be well on your way to becoming an expert in your own right.

III. Booth Considerations

HOUSEKEEPING

We cannot stress too strongly the need to keep the booth and the equipment immaculately clean. Before any film is "handled" (removed from the transit cases, wound or rewound, made up for a platter, or threaded up in a projector), ensure that the booth floor is immaculately clean, as some film will inevitably, at some time or another, whether by design or by accident, touch the floor.

You may want to seriously consider wearing white cotton editor's gloves while handling film. Even freshly washed hands can leave prints on film since skin exudes natural oils. Discard gloves when they become even slightly soiled. Gloves are cheapest insurance you can buy, typically \$8 to \$10/dozen.

Booth consumables (splicing tapes, lens and port glass cleaners, oil and grease, fuses, exciter lamps, indicator lamps, clean lint-free cloths, cleaning brushes, hold-down paper tapes, etc.) should be on hand in quantities sufficient for anticipated use. Booth equipment (projectors, platters, MUTs [make-up tables], rewind benches, splicers,

aperture plates, lenses, house reels, etc.) should be clean and in good working order.

IV. Equipment Considerations

FAMILIARITY WITH EQUIPMENT

We assume you have a working knowledge of your booth equipment. If not, acquire copies of the manuals and familiarize yourself with them. Manuals for most projection, sound and film handling equipment are to be found at www.film-tech.com by clicking on "Manuals" and scrolling. Yet more manuals are to be found at www.film-center.com by clicking on OPERATION and scrolling down to "manuals." As these are in PDF format, they may be downloaded and printed so that you can have hard copies available.

Also, go to www.film-tech.com and click on "Tips." Here you will find valuable film handling guides, written by professionals, ranging from assembling prints to making up trailers to threading equipment and more.

We suggest you maintain your downloaded manuals and other study materials in three-ring binders with labels on the spines, and store them with your other reference materials in your booth technical library.

CLEANLINESS

It is not by accident that we again stress equipment cleanliness. Before every show, ensure that projector oil levels are checked and that all parts requiring periodic lubrication are lubed as recommended by the manufacturer, using the manufacturer's recommended lubricants. Then, ensure that no lubrication residue remains on any surface to which film may be exposed.

Lenses and porthole glass must be clean and static-free to preclude accumulation of dust.

Lamphouse reflectors require periodic cleaning (say every six months), but reflectors in xenon lamphouses must be cleaned with special care since lamphouses must be opened to access the reflector. Observe the usual lamp changing precautions when working within a xenon lamphouse (face shield, protective clothing, etc.) and be sure to never touch the glass (quartz) portions of a xenon bulb with your bare fingers. Always wait until the lamp cools before opening the lamphouse door. The internal pressure of a hot lamp is 2.5 times higher than that of a cool lamp. Use a soft camel's hair brush to clean dust from the lamp, reflector, insulators, leads and internal surfaces.

If you run carbon arc lamphouses, reflectors require more frequent cleaning, certainly no less than before each show. When cleaning a glass reflector that is warm, be sure to use a damp lint-free cleaning cloth that is the same temperature as the reflector. Keeping the damp cloth on top of the lamphouse will keep it warm. A cold damp cloth applied to a warm glass reflector can result in cracking, and you don't want to know how much

replacement reflectors cost, even if they are available!

Projector heads and sound heads must be cleaned periodically. In addition to wiping up any spilled or leaking oil, clean the interiors of the heads. Be especially sure to clean the projector gates. Neumade XeKote works quite well as a head and gate cleaner and the residue it leaves is an effective gate lubricant, though a gate lubricant is not required if FilmGuard is in use as earlier recommended. Accumulations of FilmGuard residue on the sound drum may be removed with a lint-free cloth wetted with rubbing alcohol, but be sure no alcohol comes in contact with the solar cell. Wipe the drum dry after cleaning. Alcohol and film, let alone driving, don't mix.

Platters, too, require periodic cleaning. Waxes, oils and dirt from the plattered film, to say nothing of dust in the air, will collect on the platter surface. Begin with a mild detergent solution, wiped down with clean lint-free cloths. However, if this does not do the trick, a light spray application of alcohol or solvent, wiped off with clean lint-free cloths before it evaporates, followed by an application of Windex window cleaner, wiped off with clean lint-free rags, seems to be effective on Christie aluminum platters. Be sure to test your cleaning method on a small outer (unused) portion of the platter before using it just in case the solvent is incompatible with the platter material or finish. Once the platters are clean, resist the temptation to wax them! Platter surfaces should not be slippery lest the plattered film shift position. When you visit www.film-tech.com click on "Tips" where you will find much practical information.

A small investment in cloth platter covers will pay rich dividends in keeping dust off the platter surface, and especially off plattered films.

Guidance equipment and rollers should be cleaned daily with a soft camel's hair brush.

Don't overlook your splicer when you are cleaning. A toothbrush and alcohol will remove gummy splice tape adhesive residue. A clean, well-maintained splicer is vital to good splices.

Be sure to use any cleaning solvents in a well-ventilated space (exhaust fans on, doors open), in small quantities (these fluids are flammable), and ensure that no sparks or open flame are present. **NO SMOKING!**

LAMPHOUSES

In a changeover booth, both lamps should be adjusted so that, when changing over from one projector to the other with no film in the gate, the light on the screen is of uniform distribution, color and brightness. If it is not, make such adjustments as will correct the problem lest the audience notice differences in color and/or brightness between reels. Be considerate of your lenses and keep the time you are projecting without film in the gate quite short.

In a single projector booth, ensure that the light on the screen is at least uniform, of the recommended brightness, and the proper color temperature.

Several factors can affect color, such as reflector age and cleanliness, xenon lamp age, operating current, etc.

Some further advice on xenon lamps:

- Always keep lamps in their clear plastic protective cases and wear a face shield and protective clothing when installing or removing a lamp. Lamps removed must be returned to their clear plastic protective case. Don't touch the glass parts of the lamp with your bare hands ever.
- If you value your vision, never look at the lamp when lighted, except through a proper viewing glass.
- Lamp connections must be clean and tight to reduce the possibility of damage by local heating.
- Ensure proper polarity. The anode (positive electrode) is the larger one. A lamp connected with polarity reversed will be ruined within a few seconds of being turned on, and igniters may be damaged also. Have your technician friend assist you with lamp replacement
- Ensure that lamp operating current is correct. Don't be fooled into thinking that reducing the current will extend the life of the lamp. And don't exceed the current for which the lamp is designed.
- Every time a lamp is ignited a small amount of damage is done to the cathode's (negative electrode) tip. As the cathode is thus eroded, the gap between the electrodes becomes greater, making the lamp harder to strike. Thus, in a changeover booth it may be wise to leave both machines' lamps on during the show.
- Lamps may develop leaks. When this happens, screen brightness diminishes as the pressure is lost, even though the lamphouse ammeter shows rated current. Such a lamp must be turned off quickly, be allowed to cool and be discarded. It will likely look milky-gray inside. As the internal pressure will have diminished, the risk of explosion diminishes, and it may be discarded safely.
- As lamps age, evaporated tungsten becomes deposited on the inner surface of the quartz bulb (blackening), reducing the light output. As the blackening increases, heat is not being radiated properly, the bulb temperature becomes higher, and the risk of explosion increases.
- Always handle and dispose of lamps in accordance with the manufacturer's recommendations.

FILM GUIDANCE EQUIPMENT

Ensure that your guidance system is properly aligned so that there is no chance of subjecting the film to damage, and ensure that guidance rollers are clean. It is now possible to get guidance rollers with a conducting coating to help bleed static from film.

However, if you use FilmGuard as recommended, you will have no static problems.

THREADING/MAKE-UP

Check each reel for the proper leader and tail. Many film handlers are careless when breaking down a plattered print, and re-attach heads and tails without regard for proper reel sequence, and often you will encounter a single layer tape splice which may, but most likely may not, run through the projector properly. If you are running changeovers, pay special attention to properly made splices, and, if possible, preview the show without an audience so that you can catch out-of-sequence reels, missing cues, miss-framed splices and other perturbations before your audience does.

When making up a print for a platter, you will be removing the heads and tails. If the print has never before been plattered (oh, lucky you!), be sure to leave a single "reference frame," i. e., make the head cut one frame into the scene, and the tail cut one frame before the end of the scene, and use a tape splice. In this way, when you re-attach the heads and tails, you can carefully remove the splicing tape and butt and tape the splice without further frame removal. Remember, there are 22 frames after the second cue, and, when you have broken down the show, there will then still be the same 22 frames intact, so the print will be ready for showing in a changeover booth.

If the print has been plattered (and hopefully not "plattered to death"), break it down at the existing splices and use care to not remove any more frames. Each frame equals 1/24th of a second of running time, and missing frames detract from the value of a film as well as negatively impact the presentation.

For optical sound film, use "zebra" yellow splicing tape that has an "H" imprinted on it that will cover the frame line and one frame of the sound track (to prevent an unfortunate loud "blip"), as well as be visible for identifying reel changes when breaking down. (Please don't use white shoe polish or other potentially harmful substances to identify reel ends.) For all other splices, use clear tape only so as not to confuse such splices with reel changes. To prevent that loud "blip" at a splice made with clear tape or a cement splicer, a little solid black triangle may be added by black marker pen over the sound track at the splice; this will "ramp" the sound down and up quickly, and thus avoid the loud "pop" when the splice passes through the sound head. CPI tapes are recommended since their adhesive seems to stick to the tape rather than to the film, a definite advantage when un-doing a tape splice.

For magnetic sound film, a special CPI splicing tape is available.

When undoing a tape splice, carefully scrape the tape off the base (shiny) side of the film, then bend the splice and gently pull the tape off the emulsion (dull) side of the film.

The plattered film is secured from shifting off center by virtue of its weight (and the exact leveling of the platter), and by setting film retainers about the periphery of the film.

These retainers can be taped down if the suction cups don't adhere properly. However, a better tool for securing plattered film against slipping is available. Christie's new film retainer pads (rectangular shaped bars whose adhesive bottoms cling tenaciously to any surface to which they are applied) offer the advantage of firmly adhering to the platter surface. Check with your local cinema equipment dealer about getting some to try, as they are cheap (about \$7 each) insurance against the nightmare of shifting.

If you are familiar with your platter, thread it up as usual, but, if not, you would do well to get some instruction. Also, as noted before, visit www.film-tech.com and click on "Tips." There you will discover tips for making up film, using a platter, and other necessary activities.

Once you are familiar with your platter, threading it will become second nature, just as with your projector. However, a miss-threaded platter, just like a miss-threaded projector, can ruin film.

If you are familiar with your projector, thread it up as usual, making sure that the loops are not too big and not too small. Small loops can create havoc if you have to adjust framing, and large loops can put the sound out of synch as well as damage the film if they permit it to rub against the inside surfaces of the head. After threading, manually advance the film slowly (using the "inching knob," if provided, or the motor flywheel) to ensure that the film is in frame and not binding anywhere. I like to thread up several feet ahead of the leader number at which I will start the projector, then, after advancing by hand, advance to that number by momentarily starting the projector motor. In this way, any problem will become evident before the audience becomes aware of it. Remember, the projectionist is like the invisible man, and, if he does his job correctly, no one will know he's there, and *that* is one mark of true professionalism.

Remember, however, that platters don't respond in a friendly way to repeated momentary projector starts ("bumping" the motor). Find what works for you and follow it.

SETTINGS

Ensure that screen masking, if not controlled by automation, is properly set for the aspect ratio of the film. (It is a good idea to mark on the leader of each reel, in addition to the title and reel number, the aspect ratio [e. g., "FLAT 1.37," "FLAT 1.66," "FLAT 1.85," "SCOPE," etc.] so that you are reminded as you make up or thread up the show.) Be sure the proper aperture plates and lenses are in place, and that screen masking is correctly set.

Ensure that sound settings are appropriate for the type of sound track (e. g., Dolby SR, mono, etc.), and that all required sound equipment is on and working. Be sure that ancillary devices such as DTS disks are inserted.

AUTOMATION

If you have automation, ensure that all required cue tapes have been applied to the film for the functions available.

Check for proper operation of "fail safes" and other protective devices.

STARTING THE SHOW

You should have a sequence of events in mind, such as:

- Dim house lights slowly.
- Fade non-synch music.
- Start projector, open manual lamphouse dowsers
- Operate changeover dowsers and sound.
- Open title curtain at a propitious moment, e. g., just after the studio opening logo fades.
- Dim curtain lights so that they are extinguished just as the curtain is fully open.

Then carry out these events in as "seamless" a manner possible. Practice makes perfect, and properly adjusted automation can make the projectionist's life rather easy. However, a good projectionist is one who can manually perform his craft as seamlessly as the best automation, or even better.

RUNNING THE SHOW

At the very first opportunity, after starting the show, check for focus and framing. Observe the relative center of the screen and ensure that the focus is the best possible at that point, using titles or other high-contrast references. Ensure that the titles, if not scrolling, are correctly centered on the screen, and check that you have not inadvertently threaded up out of frame. We all screw up once in a while! It is likely you will encounter one or more prints that have been broken down by a careless film handler who has spliced the leader back on out of frame.

Should the picture exhibit any noticeable "jump," check the gate tension. It should be tight enough to afford a rock steady picture, but not so tight as to cause excessive wear or noise. Given the delta of nearly one mil (.001") between the older acetate film (5.6 mils thick) and the newer polyester film (4.7 mils), you may require a minor gate tension adjustment when changing from one film stock to the other.

Should the picture exhibit any noticeable "weave," there is little to be done during the show, but thereafter check the film guides for cleanliness, proper spacing and tension.

Often jump and weave problems are a function of the age (shrinkage) of the film being shown. If in doubt, run a loop of SMPTE RP40 alignment test film. There should be absolutely no jump and weave – the test pattern should be rock steady. If it is not, its time to service the projector head.

At all times during the show, and certainly after every changeover, check for focus and adjust as necessary. As most lens holder focus adjustments are vernier, your focus adjustment, if made carefully, should not be noticeable.

Listen to the booth monitor speaker. If you have a stereo processor, check all channels periodically to ensure proper function of the sound system.

Unlike the megaplexes, your booth should be staffed (unless you are the audience and you have reliable automation), since most of the common megaplex audience complaints are the result of uncaring, unprofessional and often absent staff.

If you are running a changeover booth, you will be rewinding each reel after showing. Your own films should be stored emulsion side up (heads out), but borrowed or rented films may be required to be returned tails out to facilitate inspection. In this instance, it pays to have a few spare "exchange reels" (plastic or sheet metal) in stock so that you can use them for take-up reels initially, and then use the empty exchange supply reels as take-up reels thereafter. Try not to place yourself in a position to have to do extra rewinding to get films back on exchange reels for return.

Ensure that what booth and/or lobby illumination is on during the show does not stray onto the audience and especially the screen. Often, a show is ruined by someone carelessly leaving a theater door open and permitting lobby light to intrude onto the screen. House lighting should be sufficient for safe movement during the show but not intrude into the presentation. Back in 1939 and 1940, theatres screening "Gone With The Wind" were advised by the Technicolor people to use blue colored lights for ambient house lighting, and to use muted colors such as gray near the screen, so as not to detract from the Technicolor presentation. Today's popular "Tivoli" light strips used to illuminate aisles and, when flashing, to prompt entering or exiting patrons, if not installed with care, can spoil the show by direct glare visible to the audience. Now that we think of it, the old "aisle lights" built into seat sides facing the aisle weren't such a bad idea after all.

ENDING THE SHOW

Again, you should have a sequence of events in mind, such as:

- Bring up house lights to a low level during closing credits to facilitate exiting of those "Philistines" who don't stick around to read the credits.
- Close the title curtain just as the credits close so that the curtain is closed at credit fadeout, with the MPAA rating projected on the closed curtain.
- Bring up the curtain lights as the curtain closes.
- Operate the changeover dowser and sound
- Bring up the house lights.
- Close the manual lamphouse dowser.
- Start the non-synch music.

At this point, you may be ready to break down a plattered film, and should follow the earlier suggestions regarding splicing the heads and tails back on.

VI. Presentation Considerations

ASPECT RATIO

Use of the correct aspect ratio ensures that you will be screening the film as it was meant to be screened, something you won't always enjoy at the megaplexes.

APERTURE PLATES

You should have properly fitted aperture plates that match the aspect ratio of the film you are screening and of the screen itself. Now, if you are screening a silent film on 35mm equipment, a full frame aperture plate of the standard silent aspect ratio is needed, and the projector may require a little horizontal re-alignment, and a different focal length lens, since the sound track area, usually hidden by the aperture, is part of the silent picture frame which is larger than the sound picture frame. The SMPTE standard 35mm silent aperture opening was 0.6795" high by 0.9062" wide (1.33 aspect ratio). In 16mm (1.33 aspect ratio), this is not a concern since the frame is not affected. In 16mm, its either single-perf (sound) or two-perf (silent), but the frame size remains unchanged.

FILM SPEED

This is an issue only if you are screening a silent film. If your projector has the capability (perhaps by changing gear or belt ratio) of being slowed to 18 frames per second, be sure to use that speed. Alternatively, refit the projector temporarily with a variable speed drive and motor set to the 18 frames per second speed. It is tragic that silent movies are often screened at sound speed (24 frames per second) with the resulting unnaturally animated movements of actors. A silent movie, screened at proper silent speed and with the correct aspect ratio, is a joy to watch, and does justice to the maker of the film.

FOCUS

We cannot stress too strongly the frequent checking of focus. In my library I have a 35mm print which is mostly Eastman, but one (replacement) reel is Fuji. I always have to touch up the focus on the Fuji reel for reasons I am too dense to understand. In 16mm, good focus is of even greater importance. Were you to use a rifle scope set to view the center of the screen, you could focus on the grain of the film, an interesting idea. The Simplex X-L 35mm projector head had provisions for such a device (Simplex called it a "screen scope") that enabled a fine and exact focus adjustment. Edmund Scientific (www.edmundscientific.com) makes small scopes and scope mounts suitable for installation on projectors or in

observation ports to add this convenience that was standard on Simplex projectors 40 or so years ago! We recommend this highly.

FRAME

Being in frame means more than just not seeing the frame line on the screen, it means that the image must be centered as intended by the film maker. If you screen a WB cartoon, the circular logo should be centered within the masked area of the screen. In no event should text, unless scrolling, bleed into the masking! Respect the films you are screening and the talents and dedication of their makers, and afford them the best possible presentation.

The framing knob is not a vernier control like a lens focus knob, so it pays to know intuitively which way to turn the knob to move the image up or down, and to turn the knob ever so slowly when making a minor adjustment.

Not all projectors' framing knobs afford the same "re-framing" capability, so it pays to determine by experimenting how much framing travel your projector provides. Some afford less than one complete frame of travel, and it is best to find this out before the show. Most 16mm projectors framing capability is limited to moving the aperture up and down, which, of course, shifts the image on the screen vertically, requiring a "tilt" adjustment with every framing adjustment. The good showman takes all this in stride.

TRAVEL GHOST

Not a spectral vision, but a phenomenon resulting from the shutter being a slightly out of synch with the intermittent so that it permits light to pass through the frame before its downward movement has ceased. It is best checked for during white on black credits and is characterized by fuzzy "bleed" or, in extreme cases, a white wash above the white letters. If the letters are crisp, there is no problem.

We mention this because many older 35mm projector heads were provided with a shutter adjustment to correct this anomaly if present.

SOUND

Today's motion picture sound requires little adjustment once your theatre's sound system has been aligned and balanced, except for trailers, most of which seem to be intentionally recorded loud. Thus, you may wish to subtly lower the sound while playing trailers.

RATE YOUR PRESENTATION

Go to www.film-tech.com and click on "Manuals" and scroll down to "Instructional Documents" and download "SMPTE Theater Quality Evaluation

Program." Read the suggested patron satisfaction survey form and rate your own presentation. Hopefully, you will be pleasantly surprised.

VII. FINAL THOUGHTS

SATISFACTION

There was a time when being a projectionist was a well-paid and respected craft. Projectionists were required to be licensed, which usually involved both written testing and actual performance skills testing, had to be members of an IATSE projectionists' local union, and had to ascend a seniority ladder over many years until they attained, by virtue of their seniority and growing competency, the acme of their craft as projectionists at major first run theatres. With apologies to television's ALL IN THE FAMILY, "Those were the days!"

Now, you are poised to become just such a projectionist. Revel in the joy of this attainment. You are one of a very few of a dying breed! The authors, and even the venerable Mr. Richardson in his heavenly booth, will be proud of you.

QUESTIONS?

Feel free to e-mail us with questions. If we can't answer them, we'll try to direct you to a resource that can: gordon@scsra.org or tdtech@earthlink.net.

THE FUTURE

By virtue of being a collector, you are preserving history, and, by virtue of your theatre, you are interpreting that history. Share your hobby with like-minded friends and relatives for both the joy of it and its historical preservation aspect.

At some point, all of us will die, and some of us will leave priceless film collections and quality home theatres behind. I don't mean to sound morbid, but today is the time to plan for the disposition and/or perpetuation of your film assets. It is indeed sad to read of reclusive collectors whose film assets are discarded by unknowledgeable relatives or auctioned to the bargain-seeking public on heartless and impersonal Internet auction sites. Consider including your collection in your will or living trust along with disposition instructions (established archives, schools, interested friends, relatives, etc.), so that it may live on and continue to be a piece of living history.