

A HOME-BUILT TRI-COLOUR PROJECTOR REVIVED

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Those of us lucky enough to have witnessed Martin Gilbert's demonstrations of an Ives tri-colour projection system will always remember its magical effect, as the three black-and-white screen images slide together to form one full-colour photographic picture (see *TML 21*). For a decade or so I intended to pull out from my attic a related machine and to see whether I could get it going. About two years ago, just before a visit from Lester Smith, I did dust it off and we examined it as the first part of a short YouTube series about the project.

The projector was given to me by a friend who bought a large job-lot of mostly movie equipment at auction and didn't want this 'odd thing'. It's a home-made tri-colour projector, dating from the 1930s, maker unknown. With it came three glass strips, each bearing three pictures (each strip forming a three-photo record). The subjects are: 'Man with Pipe', 'Woman in Window with Flowers', and 'House'.

I dismantled the whole machine and got the moving parts working properly. There's a control knob (from an old radio) that, when twisted, slightly rotates a horizontal rod below the slide stage, fitted to which there are two pins at right angles. These move onto the slide in order to keep it flat in the aperture. A further twist control on the top of the 'gate' gives a slight rocking motion to the fixed carrier. This helps align the slides horizontally in relation to each other. The three lens mounts are in individual wood panels which can be adjusted slightly to aid line-up – the two side panels move left and right, and the centre panel up and down. Mostly I just cleaned everything up and replaced the



1. Lester examines the projector and slides, as found. The lenses are of approximately 10-inch focal length

crumbling electric flex (that wasn't going to be used) with new period-looking cable. Most of the device is made from plywood, with a well-built lamphouse of mild steel sheet. Elements that give away its home-built origins are the domestic Bakelite light switches and a strip of Meccano.

The projector used a triple illuminant comprising three incandescent bulbs and reflectors. The three separate resistances can be seen in the illustrations. The three lenses and three internal glass colour filters – red, green and blue – were present so I was hoping that a revival wouldn't involve too much work. However, we soon determined that the lamps would require a very high-amperage electricity supply – and that wasn't feasible. In any case, the heat would be more than I wanted to use with those original slides and I would need to source heat-resistant glass – and probably add fans – so I decided to take the plunge and build three LED units from scratch. After a bit of work with a hacksaw, the large heat-sinks required fitted snugly side by side, each with a computer fan on the back. Each 100W LED chip was supplied with a special 'driver' marketed for exactly that job. The LEDs don't work with a conventional DC supply. The dimmers have been retained for cosmetic effect only, and I didn't find it necessary to try to balance the light output from the three chips. I covered some of the nickel corrosion with chrome tape and 'you can't see the join'. A 12V transformer from my junk box was sufficient to feed all three cooling fans. The LED chips needed to be attached to the heatsinks with thermal cream between. The original condensers were very dirty, but cleaned up nicely, and the three lighting units were soon working and installed. The fans make the whole thing rather noisy but that doesn't really matter.

Lester couldn't make it to the 21st-century premiere so it was just the video camera and me. I can't steal Martin's trick of bringing the



2. After cleaning up, with the original Edison lamps, marked 30V 250W



3. The internal colour filters, marked Wratten 29 [red], 61 [green], and 47 [blue]



4. The three condensers, cut vertically to align with the photographs, light sources and lenses

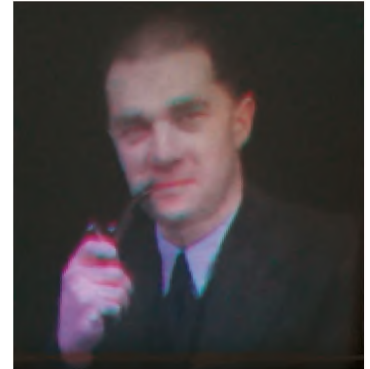
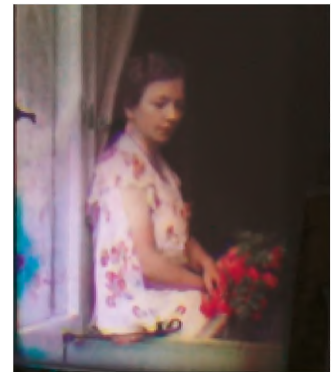


5. The new lighting units being fitted

images together on the screen but I can cover the lenses, revealing each colour until the whole full-colour image is revealed. There's some colour fringing but the screen image is still impressive. You can see the results as things progressed (search 'Horipet' on YouTube, then go to my Playlist 'Old projectors and cameras' and scroll through). There are five related 'Tri-colour' videos that show the initial examination, the restoration and lamp unit fitting, and the screen results.

We can only speculate as to how the photographs were produced, but presumably with the live subjects posed as still as possible while three successive exposures were taken on 120 (or 620) roll film, through successive filters. The house would have been an easier subject. Then the negatives were presumably mounted together and contact printed onto glass strips (cut from large photographic plates?) to create the surviving glass positives. The gentleman with the pipe is presumably the maker of this device and that was quite a project – technically somewhat challenging at the time, and not cheap with all those lamps and lenses. I wonder if one of the photographic magazines of the period has some details? This is hardly likely to be a 'home construction' article – too difficult for most – but maybe a report of a presentation is on record. If you happen to build something as nice as this, don't be too modest to scratch your name on it somewhere.

One of these days (I keep saying) I'll take some photos for this projector, with an old Kodak 120 bellows camera, some black-and-white film and suitable colour filters, then contact print the negatives onto sheet film, or another roll of 120. I just need to convert the shower room into a darkroom, buy a developing tank and chemicals, get hold of an old 120 camera, source the necessary filters and make a mount, and a printing frame, etc. 'One of these days ...'



6. The three surviving additive colour picture slides, each 215mm x 84mm

No cover glasses fitted. The word 'Nitrate' and 'Kodak' are in the border of the House strip, plus 4 notches; a code confirming that the original camera stock was nitrate based

7. The results on the screen; screen grabs from the YouTube video