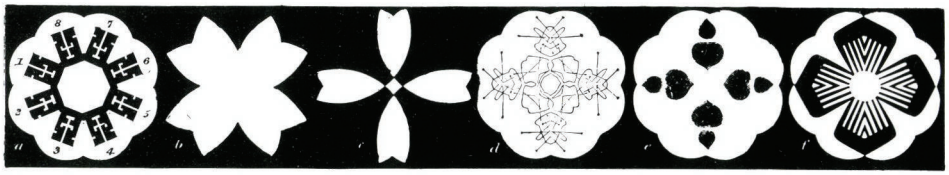
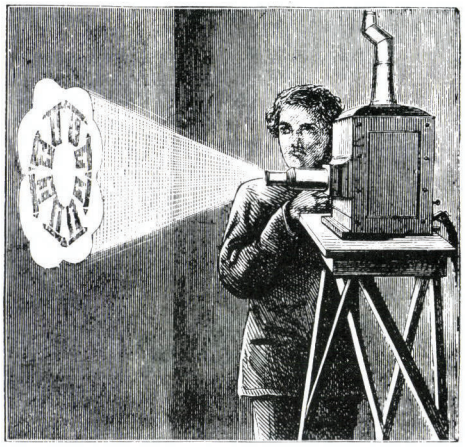
OBJECT/DOCUMENTATION:
THE DARKER KALEIDOSCOPIC PROJECTION LENS

We reproduce from the Mike & Janet Bartley Collection three items of documentation for their kaleidoscopic projection lens, as recently demonstrated to a meeting of the Magic Lantern Society so successfully.



1



Firstly from his *Cyclopaedic science simplified*, 4th edition of 1877, we have J.H. Pepper's account of how he persuaded Darker to construct the lens and his description of the results obtained with it:

(Although Sir David Brewster had spoken of the application of the kaleidoscope to the magic lantern)..... the details were not sufficiently complete to enable anyone[1] to throw the kaleidoscopic figure on the disc, (and) the author was induced to urge Mr. Darker, of Paradise Street, Lambeth, to persevere in the adjustment of the mirrors, lenses, and lighting until perfection was obtained. During the Christmas of 1866 the oxy-hydrogen kaleidoscope was exhibited daily at the Polytechnic with the greatest success, and by its means the principle of the instrument could be better understood.

It is chiefly by the adjustment of the light that the original angular opening is gradually multiplied by reflection eight times, and eight distinct sectors or divisions become visible on the disc. When the tip of the finger is now inserted, eight single reflections or four double ones are the result, and by thrusting in all the fingers the curious figures shown at *e* (1) are obtained.

Not only are transparent bodies, such as glass, exhibited with success, but any opaque object will produce the most distinct and symmetrical figures on the screen; the pattern *d* is chiefly produced with a cell containing only pins and needles. If glass be used, it should always be broken from coloured glass rods with the hammer, in order to secure the conchoidal fracture, as the wedge-shaped figures give gradual tones of colour, which are very pleasing to the eye, and produce fair imitations of the colours and groupings of rubies, emeralds, and sapphires when projected on the screen.

A gentleman, who saw these and other patterns, and especially some obtained by using ferns and other natural objects, was so pleased that he stated it was his intention to have an oxy-hydrogen kaleidoscope fitted up in his calico-printing establishment, in order to assist the artist who designed the patterns; and he stated that, although they had long used the ordinary kaleidoscope for this purpose, the oxy-hydrogen one gave a much better notion of the effect required to be produced, and would enable the manufacturer to select and decide upon the best patterns for commercial purposes.

The property of reflection is affected more by the condition of the surface than by the physical nature of the substance used as a reflector. The kaleidoscope reflectors employed by Mr. Darker are made of the best plate glass, coated with metalic silver, or, better still platinum, and it is extremely difficult to prevent a slight deposit of moisture on them. The watery particles greatly impair the kaleidoscopic figures, and demonstrate how thoroughly the power of reflection depends on the state of the surface, as this exquisitely thin film of moisture interferes with the perfect illumination of the kaleidoscopic figure. By a simple arrangement of the tube containing the focussing lens, air is pumped through and over the mirrors, and by this means the moisture deposited may be quickly removed.

We begin to detect here that the lens may, perhaps, be rather difficult to work and find confirmation of this in the unexpectedly elaborate *Operation Instructions* provided by Darker's with the commercial version of their lens (2).

The precision with which these instructions need to be carried out for complete success is acknowledged by Mike and Janet and is also reflected by the hand-written letter (3) in which Messrs. Darker seek to reassure one of their customers, a Mr. Goddard, who seems to have had some difficulties with the lens:

The Kaleidoscope which you had works very well as we tried it here in your lantern – it only wants you to practice the adjustments as per the enclosed instructions.

Raise the light as high as you can (we sent you a piece of wood for you to put under the jet) then push the jet as far into the condenser as you can – next slightly revolve the kaleidoscope and all will be right.

1. See 'The origin of the kaleidoscope' by Hermann Hecht in Magic Lantern Society *Newsletter* No.7, November 1982, for details of earlier projection kaleidoscopes.

2

INSTRUCTIONS
FOR USING THE
LANTERN KALEIDOSCOPE.
(C. & F. DARKER'S PATENT.)

Unscrew the brass front from the Magic Lantern, and into its place screw the Kaleidoscope; place a Chromatrope or other slide in the usual groove of the Lantern; then, by means of the *large* sliding tube, push the Kaleidoscope in and out until its back lens is at the proper distance from the slide; now turn the instrument round till the reflectors are upright, like the letter V; next, raise the light above the centre of the condensors;—with oil lamps the elevation should be about half an inch, but with the oxy-calcium one inch; push the light backwards and forwards in the usual way, to obtain the best illuminating power, and focus the picture on the screen by means of the *front* sliding tube. Should there be any dark parts it is only necessary to turn the Kaleidoscope round a very little to the right or left to get rid of them.

Oxy-calcium or oxy-hydrogen lamps can be raised by means of the rod at back of Lantern. In the case of oil lamps, they can be supported on two small pieces of wood half an inch thick, placed on the pan. It is advisable to warm the instrument before using it, to prevent its steaming. Should any moisture get on the reflectors or front lens, the brass front can be removed for a few moments.

Chromatrope frames with pieces of coloured glass to form the usual Kaleidoscopic effect can be supplied with the instrument if required.

3

9 Paradise St.
Lambeth
London

R. Goddard Esq.
Dr Sir

The Kaleidoscope which you had works very well as we tried it here in your Lantern – it only wants you to practise the adjustments as per inclosed instructions

Raise the light as high as you can (we sent a piece of wood for you to put under the jet) then push the jet as far in to the Condensers as you can – next slightly revolve the Kaleidoscope & all will be right

We remain
Yours Obediently
C & F Darker