

THE BRENOGRAPH IN ACTION

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POMONA IS A SMALL TOWN (its population is less than 900) in Queensland, Australia, about 100 miles north of Brisbane. Among its few tourist attractions is the Majestic Theatre. Claiming to be 'The Oldest Authentic Silent Movie Theatre in the World', the Majestic has been running continuously since 1921. One of its rarer features, and its principal interest for the magic lantern world, is a working example of the remarkable Brenkert F7 Master Brenograph Lantern, a huge beast which was described by Jack Judson in an article in the Society's 2005 publication *Realms of Light*.¹

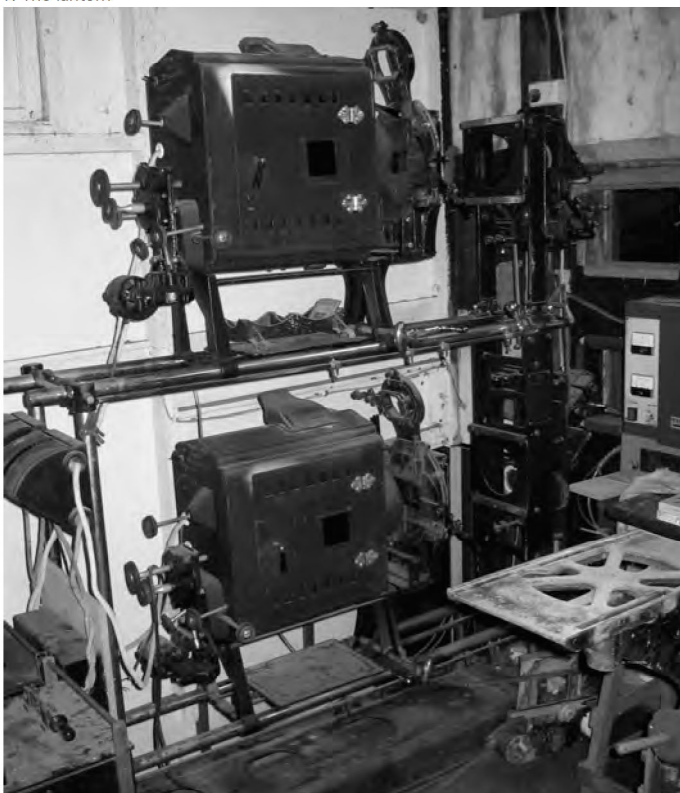
In the summer of 2005 I met the owner of the Majestic, Ron West, who after a brief chat agreed that in exchange for access to the lantern and all its accessories, I would act as 'Master Brenograph Operator' during his Silent Movie Festival, which has been held annually each September for the last ten years. As a result I spent several pleasant afternoons cleaning, adjusting and projecting with the F7, enjoying endless opportunities to explore its many unique capabilities.

While built primarily as a movie theatre lantern, the Brenograph F7 owes many aspects of its design to the magic lantern and, in the words of Jack Judson, 'shows a clear and direct lineage from the biunial lanterns of the previous century'. Jack also described it as 'the ultimate biunial lantern'. The Brenkert Light Projection Company of Detroit, Michigan, builders of the Brenograph, claimed that it was 'so flexible in operation that an endless variety of novelties, presentations, scenic and colour effects can be produced by any projectionist who will study and master its fundamental operating principles'.²

THE LANTERN(S)

Cosmetically, the Pomona Majestic F7 was not in great condition (Fig. 1). Most parts had some degree of corrosion and deterioration. Although Ron had rescued the lantern with its accessories and slides he had not been able to carry out any recent maintenance. However, almost everything worked perfectly, with only the occasional electrical 'hiccup'. Photography was difficult; the lantern is huge and stands at one end of the projection room, surrounded by enormous film projectors. It was impossible to get far enough away to adequately photograph the machine in its entirety.

1. The lantern



The Brenkert *Operator's Manual* described the lantern as *A master projector which enables the operator from his projection room to project to any part of the stage or front of the auditorium in any size or shape desired with a wide range of light intensity, any focused or unfocused object in colour either in animation or stationary except the motion picture film*.³

It is perhaps a bit simplistic to describe the Master Brenograph F7 as a biunial, although it has all the major characteristics of a double lantern. It might be more accurate to think of it as a pair of parallel optical benches, arranged one above the other.

The F7 is composed of an upper and lower lantern, joined together and identical in every respect. However, in operation the two systems are entirely independent, the only direct linkage being a fader diaphragm at the front. Each lantern consists of a lamphouse, a shutter and effects holder, a front upright assembly, and a front projection assembly. The whole lantern assembled stands 73 inches (185cm) high and is 82 inches (210cm) long. It is designed to be operated from the right-hand side looking towards the screen or stage.

THE LAMPHOUSES

The twin lamphouses (Fig. 2) contain 75-ampere vertical feed carbon arc burners. For this size of burner, copper-coated carbon rods are used. As well as the normal set of adjustment controls the carbon arc burners feature magnetic relay arc controls. These were not wired up on this lantern, but when properly set up they should automatically adjust the carbon rods (which of course grow shorter as they burn away) to provide continuous maximum light. My experience of operating the lantern was that the rods needed manual adjustment every 30 to 45 seconds. It was easy, while concentrating on operating the slides and effects, to suddenly run out of light. The lamphouse doors have the normal cobalt blue glass windows for viewing the burner and these worked very effectively. The lamphouses also contain a small electric light, used when setting up the burner or changing rods. The front of each lamphouse contains a 6-inch (15cm) condenser lens with what Brenkert described as a 'dowser shutter' operated by a small lever on the outside of the



2. Lamphouse, showing carbon arc burner. The condenser lens is covered by the dowser shutter – used for fading. The automatic arc feeder mechanism can be seen at the back of the lantern below the normal manual arc controls.

NOTES

1. See Jack Judson, 'The Wondrous Brenkert Master Brenograph', in Richard Crangle, Mervyn Heard and Ine van Dooren (eds), *Realms of Light: Uses and Perceptions of the Magic Lantern from the 17th to the 21st Century* (London: Magic Lantern Society, 2005), 211–13.
2. *Projectionist's Operating Manual for the Brenkert F7 Master Brenograph* (Detroit: Brenkert Light Projection Company, 1928).
3. *ibid.*



3. Heat sink tank located on a sliding rail. Shown here pulled out to the left side of the F7. An advertising slide for Gone with the Wind can be seen in the slide tray.

THE SHUTTER AND EFFECTS HOLDER

Immediately in front of the condenser lens, this assembly has a series of slots or holders. The first of these (moving away from the condenser) is the shutter compartment. This can hold a preset iris shutter or a framing shutter. The framing shutter (Fig. 4) comprises an assembly with four independent adjustable side shutters, which can be adjusted to control light 'spill' off the edge of the screen or to set the image up to cover only a portion of the screen. By careful adjustment of the shutters, together with adjustment of the front mirrors (see below), the pair of lanterns can be set to project slides for dissolving views or with the images side by side.



4. Preset adjustable framing shutter



5. Preset adjustable iris shutter

The preset adjustable iris shutter (Fig. 5) is typically inserted if the lantern is being used as a spotlight. Adjustment of the aperture allows the operator to vary the diameter of the circle of light projected, and also the sharpness of its edge.

In front of the framing shutter holder there is a mask compartment for holding a screen border or special masks, then an effects holder compartment (Fig. 6) for glass design plates, animated scenic effects and stationary colour frames (see below). Finally there is a slide carrier for 4 by 5-inch (10 by 12.5cm) slides. This can be replaced by a hinged carrier for US standard size 3¼ by 4-inch (8 by 10 cm) slides. There are also inserts for the standard English size 3¼-inch-square slides.



6. Shutter and effects holder – showing compartments for slides and accessories. The handle on the lantern body operates the dowsler shutter. A slide carrier for 4 by 5-inch slides is in place. A holder for 4 by 3¼-inch slides is swung up, out of the projection path.

housing. This consists of a solid circular shutter that can be lowered between the burner and the condenser, acting as a fader.

On the Brenograph at the Majestic, immediately in front of the condensers are liquid tanks forming a heat sink (Fig. 3). The tanks are designed to be filled with an alum-based solution, and are mounted on sliding rails so can be moved in or out of the light path. None of the Brenograph manuals or catalogues I have seen mention this system, but it is certainly an original accessory. The heat output from the 75-ampere burners is prodigious; a standard slide is positioned at least 10 inches (25cm) from the arc but still reaches a very high temperature without the heat sink in place.

normal to use the framing shutter and not uncommon to use the mask compartment and effects holder and/or slide carrier simultaneously.

FRONT UPRIGHT ASSEMBLY

The front upright assembly (Fig. 7) of each lantern consists of an effects holder slot, which is used with blending colour wheels or other similar effects (see below). These effects are designed to be projected out of focus, and the assembly holder is positioned to intercept the light path at its narrowest point after exiting the condenser.



7. Front upright and projections assembly with turret lenses and pair of 45-degree mirrors. The slot for blending colour wheel is on the left.

FRONT PROJECTION ASSEMBLY

The front projection assembly is a turret holder for four projection lenses of 4 inches (10cm) diameter and varied focal lengths to cover different projection distances. The turret has an indexing device to immediately register each lens as it is turned. Both lanterns have an identical set of lenses. Brenkert supplied lenses from 10 inch (25cm) to 29 inch (73.5cm) focal lengths in steps of 1-inch increments, and from 30 to 40 inches (76 to 100cm) in 2-inch increments. The Majestic lantern had pairs of lenses of focal lengths of 40, 26, 20 and 15 inches. These were used as flood/spotlight lenses, lantern slide projection lenses, moving scenic effect lenses and for colour effects on the stage curtains or proscenium arch. On this lantern one of the 15-inch lenses was broken.

The iris dissolve assembly is operated by a handle on the centre rail and opens or closes iris shutters on each lantern to create dissolving effects. The linkage has two settings, allowing quick or slow dissolves.

Immediately in front of the projection lenses is a mirror inclined at 45 degrees. On the upper lantern this mirror reflects downwards and on the lower lantern it reflects upwards. Six inches (15cm) from each of these mirrors is a second mirror, again inclined at 45 degrees to project the image forwards. So on the upper lantern the light passes through the front projection lens and then hits a 45-degree mirror and is diverted downward. When it hits the second 45-degree mirror it is projected forwards. On the lower lantern the set-up is reversed. The mirrors are surface coated to prevent internal glass reflections. This mirror arrangement has two benefits:

The vertical separation of the lanterns is much reduced when the images are projected out into the auditorium. The optical axes of the two lanterns are approximately 4 feet (120cm) apart, but because of the mirror arrangement the two projected image beams are only about 15 inches (38cm) apart. This helps with image alignment, parallax and focusing or fading effects. The front mirrors are all fully adjustable vertically and horizontally, making alignment very simple. The second mirror on both lanterns is actually formed by a pair of mirrors, mounted side by side on a sliding rail. This means that without any adjustment on either lantern the mirrors can be immediately pulled across to move the projected image to another surface in the theatre. For example a slide projected on the screen from one lantern can be instantly 'flipped' by sliding the mirror so that it moves to being projected on the ceiling. Flipping the second mirror on the other lantern can immediately put a light on to the orchestra pit or the conductor or announcer. With practice and careful setting of the mirrors it is quite easy to move images around the theatre walls and ceiling instantaneously.

THE LANTERN ASSEMBLIES

The two lantern assemblies are mounted on parallel rail systems. Each lantern housing can be moved backwards and forwards along its longitudinal axis by a rack-and-pinion mechanism operated by turning a handle. This is how the image is focused. There is also a series of movable indexing pointers. These can be preset so that the

lantern housing can be immediately focused on different projection surfaces – the proscenium arch, stage curtains, screen, etc. – when making changes in projection lens focal lengths. A slide holder fits across the focusing rails for the storage of 3 by 4-inch or 3¼-inch-square lantern slides.

STANDARD SLIDES

In its simplest application the F7 can project ordinary lantern slides of either the US or British standard sizes. The most common use of these would normally be cinema advertising slides – announcements of forthcoming features, advertising for local businesses and so on. These slides were produced in their thousands by many different manufacturers.

Slides in other formats were specifically produced for the Brenograph F7, mainly made by the Brenkert company, Maurice Workstel or the General Transparent Display Company. These slides measure 5 by 4 inches (12.5 by 10cm) and were typically made in themed ‘pairs’, either monochrome or coloured. The themed pair concept uses a set of two slides that represent a positive and negative image of each other (Fig. 8). Projecting the two slides simultaneously in perfect registration would give a white screen. However, introducing a colour filter into each lantern would produce outlines and shapes. Adding a blending colour wheel to one or both lanterns produces scenes with changing light. Using coloured matching pair slides can produce very sophisticated changing scenes and remarkable effects.

8. Pair of positive and negative 4 x 5-inch slides



Workstel produced dissolving sets of up to 12 slides showing a scene with sunsets, haloes, coloured clouds, aurorae and other atmospheric effects. In the hands of a skilled lanternist the possibilities are endless. There are also mask slides that block part of the image, so that for example only the proscenium arch is covered by the projection, or only the centre of the screen. This would allow an ordinary slide or movie to be shown on the screen while the proscenium was illuminated with a chromatrope or other effect.

The Majestic collection contains around 300 pairs of slides, about 120 of which are in colour. The range of subjects is phenomenal, from simple geometric patterns to complex scenes and illustrations.

My favourite was the ‘Devil rising from the flames’ (Fig. 9). This is formed by a pair of coloured slides, one of which is projected through each lantern with a colour wheel. The two contrasting images are then dissolved in and out of each other. The ‘positive’ and ‘negative’ colouring in the slides means that in one lantern the figure of the Devil is continually changing with the colours from the colour wheel, while in the other lantern the foreground and background change. The combined effect is quite dramatic. When I used this pair at the Pomona Silent Movie Festival, Ron West played appropriately dramatic music on the theatre’s Wurlitzer organ.

9. Devil slide



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GLASS DESIGN SLIDES

Design slides (Fig. 10) for the Brenograph consist of a pane of glass (sometimes, again, these slides are provided in matching complementary pairs) that is placed in the effect holder in order to distort the image or colour effect. A simple ‘bee’s-eye’ effect slide is very effective when projected with a revolving colour wheel.

Embossed effect slides (Fig. 11) were also produced, showing scenic views which could be projected with coloured filters to give pseudo three-dimensional images.



10. Glass design slide



11. Embossed glass slide



12. Animated scenic slide of flower petals showing clockwork drive



13. Hand-painted mica disc for animated scenic slide carrier – clouds

ANIMATED SCENIC EFFECT SLIDES

These devices (Figs 12 and 13) consist of an aluminium canister, similar to a movie film reel container, enclosing a clockwork drive mechanism. The canister contains a mica sheet, hand-painted with one of a large number of available designs and connected to the clockwork drive. The exterior of the housing has a mechanical on/off switch.

The canister is placed in the Brenograph’s effects holder. Once this is slid into place, turning the on/off switch begins to turn the mica disc in front of the lantern (the clockwork mechanism has only one speed), creating a rotating image on the screen. The entire housing canister can also be rotated around its holder, with the effect that the rotating image appears to move from left to right, right to left, vertically up or down, or even diagonally across the screen.

The canister can be opened and the mica disc exchanged for another one, so that only a few clockwork canisters are needed with a collection of mica discs. The Majestic collection of discs included clouds, aurorae, snow, birds, fish, a waterfall and a pair of wonderful but damaged countryside scenery discs. One of these showed a landscape in daylight, the other the same scene at sunset. These would be used with a panorama train slide to give the ‘dissolving view’ effect of a train moving through the countryside from day into night. Brenkert also made electrically driven animated slides as well as the clockwork design, but there are none in the Majestic collection.



14. Electric panorama slide carrier with hand-painted Louvre panorama photographic slide

PANORAMA SLIDES

The Majestic Brenograph has a small collection of panorama slides (Fig. 14). These measured 18 by 5 inches (46 by 12.5cm). There is one train slide to use with the landscape discs described above, and a night view of Manhattan with all the skyscraper windows lit up. Ron believed this was used with a static boat slide and would have been part of a dissolving view set. The collection also includes a superb hand-coloured panorama photograph of the Louvre in Paris, which contains some exquisite detail.

There are two carriers for moving the panorama slides across the light beam of the Brenograph. One is operated manually or by a clockwork mechanism, the second is an electrical carrier that drives

the panorama slide through using a motor. While this item is undoubtedly a Brenkert-manufactured accessory, there is no mention of it in any Brenkert catalogue I have seen.

BLENDING COLOUR WHEEL AND GELATINE COLOUR HOLDERS

The front upright assembly of the F7 Brenograph was specifically designed to accept the blending colour wheel or gelatine colour holders. The colour wheel (Fig. 15) is driven by a clockwork mechanism, and consists of twelve separate coloured segments, which give a constantly changing 'rippling' colour effect on the screen. When used in conjunction with the positive/negative slide pairs or one of the animated scenic effect slides it can produce startling, endlessly changing scenes. I frequently used a colour wheel on each lantern with slide pairs, to great effect. The front upright assembly can also be used for single-colour gelatine colour holders, either in conjunction with positive/negative slide pairs or animated scenic effects to cast the same colour across the entire projected image.



15. Blending colour wheel

OTHER BRENOGRAPH ACCESSORIES

Two accessories that Brenkert produced that were not in the Majestic collection were a 'star shutter' and a 'lobsterscope'. The star shutter is an adjustable diaphragm shutter in the shape of a star. Operated by a side lever it was typically used for projecting on to the curtains or organ console – it is described in the Brenkert catalogue as producing 'charming effects'.⁴ The lobsterscope has an opening diaphragm in a shape similar to an opening eye. Fitted with a rotating handle, it was used to quickly flash light on to the organ console, orchestra pit or stage during musical numbers or acts, giving a strobe or flashing light effect.

Aside from its use as a projecting lantern the F7 was also frequently employed as a conventional spotlight. By use of the iris shutter mentioned above it could cover the wide range of effects produced by a normal spotlight. Gelatine colour holders could also be utilised with the spotlight.

A TYPICAL EVENING AT THE CINEMA IN 1924

The Brenograph lantern now in Pomona came originally from the Prince Edward Theatre in Castlereagh Street, Sydney. Owned by Paramount, this movie theatre opened in 1924, showing *The Ten Commandments* on the first night. Ron West rescued the lantern from the Prince Edward Theatre after its closure in 1965.

According to a contemporary account, at the opening presentation of the Prince Edward Theatre Sydney, the audience was expected to be seated by 8pm ready for the entertainment to begin. The evening started with a 'Celebration Talk', which lasted four minutes. Then Eddie Horton, American organist, entertained the audience with three numbers: 'Berceuse', 'Australian Maid' and 'My Hero'. By 8.14 it was the orchestra's turn. Will Prior, another American, conducted the 20-piece band in Rossini's 'William Tell Overture'. Projections using the Brenograph accompanied the music.

This was followed by a live acted prologue to the film, illustrating the visitation of one of the plagues of Egypt. This featured Eric Harrison as the Pharaoh, and was augmented by the appearance of Vera Bain as his favourite dancer and Pauline Miller and Stella MacPherson as slave girls. The prologue lasted a few minutes. Then it was time for the main entertainment: at 8.26 the silent film *The Ten Commandments* was shown. The film was accompanied by the live orchestra playing a soundtrack arranged by Will Prior.

A short interval interrupted the movie. The audience would gather in the lavish lobby by the fountain, laughing, talking, smoking or eating. An Egyptian gong sounded to summon them back into the auditorium for the conclusion to the film. The evening was rounded off with a rendition of 'God Save the King' played by the orchestra and sung by the audience following words projected on to the screen.

This programme was performed twice a day, at 2 and 8pm, for 36 weeks. The film and the theatre were both very successful and popular in Sydney. The theatre held approximately 1,200 people and was considered 'small', especially by contemporary American standards. Depending on the complexity of the projection, the lantern images might be played on the proscenium arch, curtains, screen or ceiling.

During the 2005 Silent Movie Festival in Pomona the format was somewhat similar, with Brenograph shows before the screening, between movies and during the interval, and while the audience made their exit. This was the first public show for the projector in several years. The Festival programme included films by Lon Chaney, Rudolph Valentino, Buster Keaton, Harry Langdon, Laurel and Hardy, and some early Australian silents.

I found the lantern very simple to operate but had to continually remind myself to adjust the carbon arc burners. Fortunately Ron had an extensive stock of rods. It was also quite difficult to coordinate operations between the projection room and Ron on the organ at the front of the theatre, some 120 feet (36 metres) away. Fortunately Ron's skills enabled him to adapt the music and so camouflage my errors. It is also important to make sure all the clockwork drives are fully wound up!

CONCLUSION

The Brenograph F7 is really unlike any conventional biunial lantern; although capable of all the applications of a 'normal' lantern it can do much more. Its size means that it has to be a permanent, immovable fixture, and it is therefore unlikely ever to be seen unless you are fortunate enough to be invited to the projection room of a preserved cinema.

However, its capabilities are also greatly enhanced by its size. The separation of the two lanterns allows the large circular animated clockwork slides to be used, while the mirror system at the front means the resulting light exits the lantern at a separation fairly close to that of a conventional biunial. The ability to instantly change the front pair of projection mirrors adds a new dimension to projecting, allowing dissolving views to be almost instantaneously swapped to project images side by side. Additionally each lantern has the equivalent of four slide carriers, all capable of being used at the same time. The projection possibilities with a Master Brenograph are limited only by the operator's imagination. To quote the Brenkert manual, 'it would be an endless task to enumerate in detail all the varied results to be obtained by its use'.

However, operating the lantern is not without some difficulties. The sheer size of the thing makes the accessories quite large and some are very heavy. Changing the animated slides or electric panorama carrier on the upper lantern can be awkward and difficult. And I operated the lantern in a small projection room with a corrugated tin roof, in a tropical climate at around 30 degrees Celsius. After just a few minutes, with both carbon arc burners running, the heat in the confined space was pretty unpleasant.

Despite all the interesting features and fantastic effects this lantern could achieve, its use was limited to those brief periods while the audience arrived, departed or waited for the next feature. Designed to be used in the great movie palace theatres of the 1920s and 1930s, its working life was relatively short. It is probable that only a handful of examples exist today and even fewer are in working order or regular use.

It was my privilege to experience the Brenograph first-hand, complete with carbon arc burners – a rare opportunity for any enthusiast. For that, I would like to express my sincerest thanks to Ron West. Since I last visited the Majestic, Ron has sold it to the local Chamber of Commerce. Moving from private to public ownership makes the theatre eligible for many sources of public funds and grants. The future of the theatre and its Brenograph is thus assured.

Finally, I should mention that on my first sight of the lantern, a snake was comfortably curled up around the upper rails. Ron 'shooed' it away, assuring me it was a completely harmless carpet species.

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4. *Brenkert Projectors and Effective Lighting Catalogue No. 26* (Detroit: Brenkert Light Projection Company, 1929).