THE PROJECTED IMAGE
A Short History of Magic Lantern Slides

JOHN BARNES

In the second part of the *Catalogue of the Barnes Museum of Cinematography*,[1] we traced the evolution of the magic lantern as an optical instrument, but the history of projection would not be complete without some consideraton of the pictures that were projected. As a writer on the magic lantern observed in 1866,

> A magic lantern without a collection of slides may not inappropriately be compared to a theatre without scenery or actors.[2]

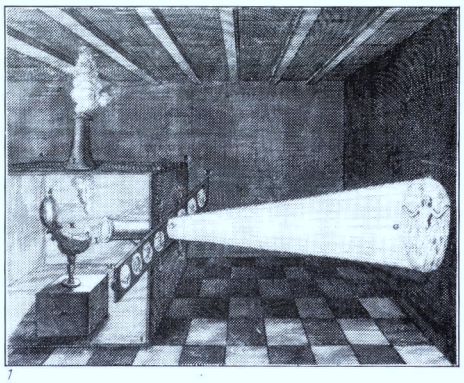
Evidence suggests that the invention of the magic lantern, or optical projector, is due to Christiaan Huygens in the middle of the 17th century, and whereas a few facts are known about Huygens' lantern, nothing at all seems to have been recorded about the kind of pictures that were used with it and we can only say that they were transparent paintings on glass.

There was obviously no difficulty involved in improvising coloured slides at this period. Paintings on glass had already existed for a considerable time, even as transparencies to be viewed by transmitted light in the manner of stained glass windows, and narrative scenes had been depicted on all manner of glassware such as drinking glasses and goblets for example. The merest daub painted on a piece of glass was sufficient to display the optical powers of the magic lantern, provided the colours were made sufficiently transparent.

The Jesuit Father, Athanasius Kircher, often, but erroneously regarded as the inventor of the magic lantern, was perhaps the first to direct attention to the kind of slides used with the instrument, and in the second edition of his book, *Ars magna lucis et umbrae*, published in 1671, the engravings depicting two rather fanciful representations of the magic lantern provide a few particulars regarding the slides. In the first engraving (1) a slide is shown in position in the lantern (although not inverted as, of course, it should be). It is depicted as a long narrow frame of wood, inset with eight glass discs upon which the pictures are painted. On the end of the wooden frame is a small lug or boss, presumably designed for holding when pushing the slide past the objective lens. A similar arrangement is also shown on the frame in the second engraving (2) but here the slide is depicted somewhat foreshortened and it is impossible to determine the number of pictures it is supposed to contain since only two are discernable, but obviously it conforms to the same pattern as the former. The figures which are suggested on both of these slides are too indistinct to be properly identified, but the images of two of the pictures are shown projected on the wall and are of a rather macabre nature. The first seems to resemble a soul in Purgatory engulfed in flames, and the second, the figure of death holding his traditional hour-glass and scythe. Similar 'frightful representations' were henceforth to serve the magic lantern for a long time to come.

A contemporary of Kircher's, Johann Christoph Sturm (1635–1703) who had a better understanding than Kircher, of the optical principles involved and was first to publish an illustration of the instrument in a practical form (3) also provides an interesting example of a magic lantern slide, the subject of which is a head of Bacchus, the Greek god of wine – the first screen close-up?[3] (4)

Johannes Zahn, who gives the most comprehensive coverage of the magic lantern of any writer during the 17th century, describes and illustrates (5) several lanterns using slides of the Kircher type, but he also includes a lantern of a different kind designed for projecting a number of pictures painted upon a glass disc.[4] Circular slides were not generally used however, until the



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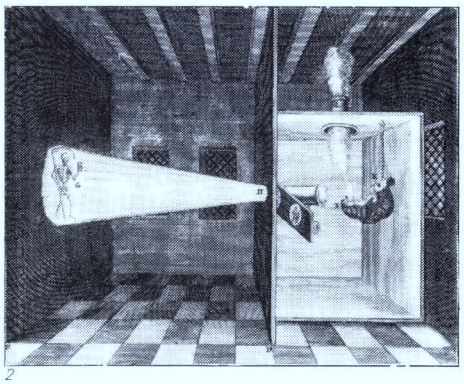

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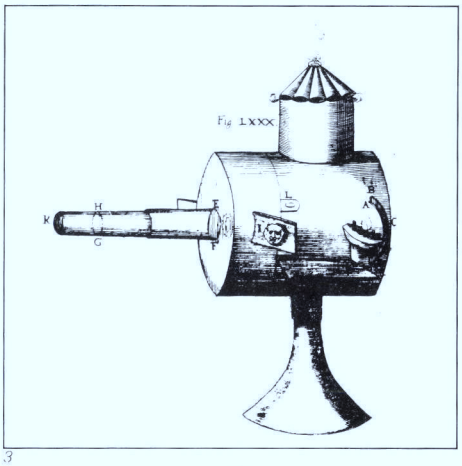

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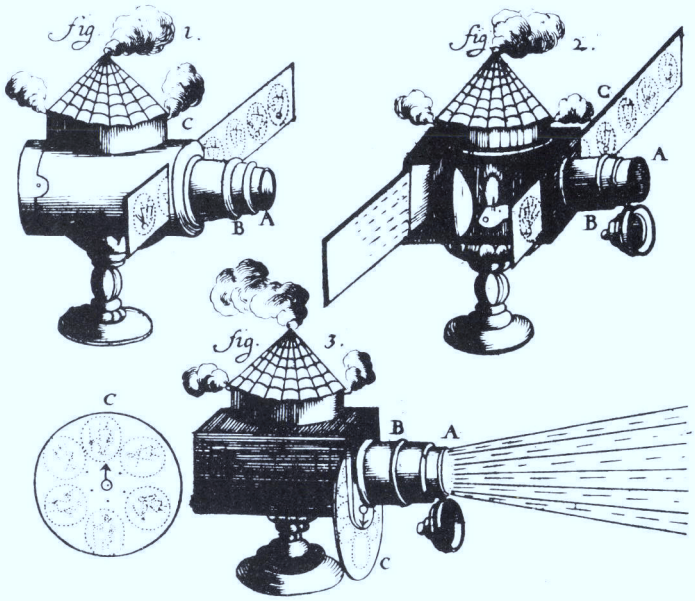
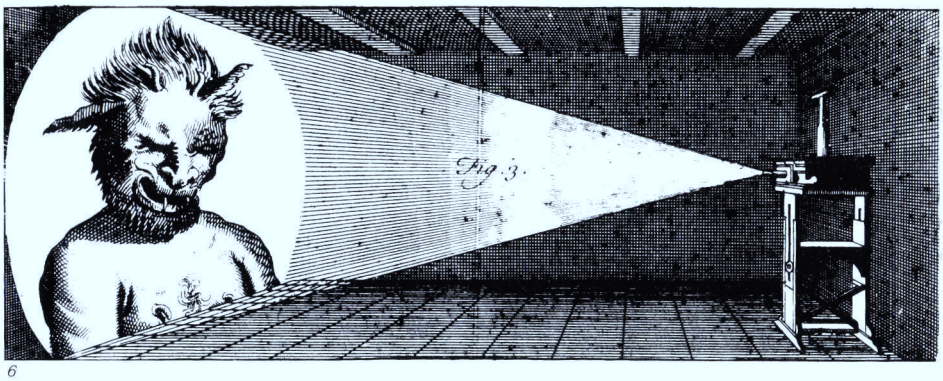


Science Museum, London



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end of the 19th century, when certain toy magic lanterns were manufactured in Germany which employed slides of this shape. Some circular glass slides painted by Abraham Helmhack (1654–1724) now in the Victoria & Albert Museum, South Kensington,[5] although described as magic lantern slides, were more probably for use in a revolving picture drum, or peep-show device, such as originally described by Kircher and previously referred to in the second part of the Barnes *Catalogue*.[1] Disc slides for projection were however a feature of several early moving picture devices current in the 19th century and which may be described as projecting phenakisticopes and a cinematographic apparatus called the Kammatograph, which recorded and projected a consecutive series of photographic images on a circular glass plate, was invented by L. Kamm in 1898.

The most usual type of magic lantern slide in use during the 17th century followed the pattern set by Kircher and generally depicted grotesque or supernatural subjects. William Molyneux in describing the magic lantern in his book *Dioptrica Nova* (London, 1692) writes that the subject is **'painted in dilute and transparent colour on plain thin glass... This is usually some ludicrous or frightful representation, the more to divert the spectators.'**[6]

A magic lantern show is mentioned by Samuel Pepys in his diary for August 19, 1666,[7] when 'strange things' were made to appear on a wall. What those strange things were he does not record, but presumably they were fitting subjects calculated to exploit the magical connotations associated with the instrument. The very name 'magic lantern' is a reflection of the macabre nature of the subjects favoured for presentation at that time.

The French mathematician Pierre Petit, in a letter to Christiaan Huygens written in 1664, refers to the instrument as the lantern of fear (*lanterne de peur*). It is little wonder that subsequent writers on natural philosophy more often than not, dismissed the instrument as little more than a toy, fit only to amuse the ignorant populace. It was the Dutch scientist W. J. 's Gravesande (1688–1742) who first thought it worthy of scientific consideration and applied his talents to the perfection of the apparatus. It is some measure of his success that the principles he formulated were not to be improved on for close on one hundred years. It is a little surprising then to find that he did not give equal importance to the improvement of the slides themselves. In their design and content he left matters more or less as he found them. **'That they may be moved easily'**, he wrote, **'they are put into flat boards, three to a board. The picture also may be painted upon long glasses.'** In the engraving (6) which illustrates his text, the image shown projected on the wall by his improved magic lantern is the already familiar 'frightful representation' – a devil with horns.[8]

One of the first to make improvements in the construction of lantern slides was the Dutch scientist Pieter van Musschenbroek (1692–1761), who devised various means for imparting movement to the figures. This he achieved by using two pieces of glass, one moving in front of the other. He painted part of the picture on a fixed glass and part on a moveable glass and combining the two, he was able to design a variety of figures which could be set in motion by manipulating levers or pulleys to which the moving parts were attached. He also used pieces of mica where the use of glass was less practical.

In his *Essai de physique,*[9] of 1739, Musschenbroek illustrates and describes five different mechanical slides worked on the principles outlined above (7). The first represents a windmill, which except for the four sails, is painted on a stationary glass fixed in a wooden frame. The four sails are painted on a glass disc glued in a copper mount. This latter is made to revolve by a cord which passes round it to a hand-operated pulley wheel. When the pulley is revolved, the effect on the screen is of a windmill with its sails revolving.

The second example represents a man holding a goblet. The man is painted on a fixed glass, but the hand which holds the goblet is painted on a moveable glass. This latter is enclosed in a round copper mount and held in place by two small plates which allow it to move freely over the fixed glass. A lever is attached to the moving part by a pivot so that when the lever is pulled out or pushed in, the figure raises the goblet to the mouth, or lowers it.

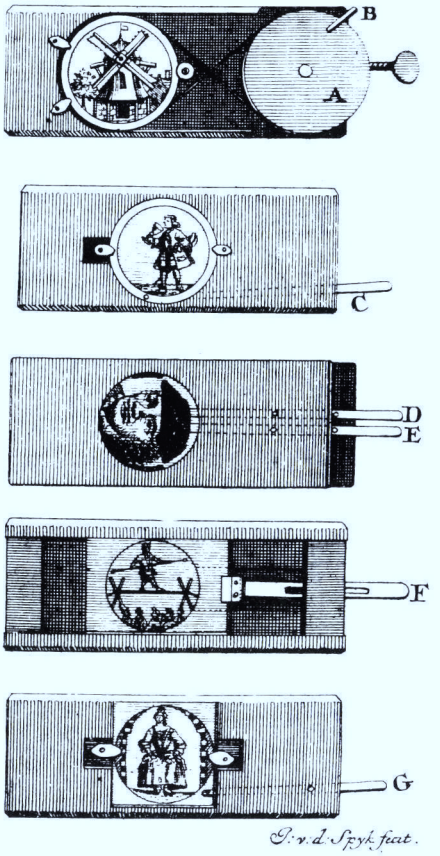
The third slide is a head with a wig and hat. A bald head is painted on a fixed glass. The wig and hat are represented on two pieces of mica, each of which is attached to a copper lever. The action of the levers causes the hat and wig to be removed from the head independently of one another, or they can be replaced on the head in the same way.

Slide number four is a rope dancer. The rope, with the spectators, is painted on the fixed glass. The dancer is represented on an oblong glass which can be drawn along by the lever which is attached to it. This glass can also be moved up and down in a groove, so that one can vary the movements of the figure at will.

The last slide Musschenbroek describes, is of a lady whose two feet and half her legs are painted on a fixed glass, whilst the rest of her body is painted on a second glass which can be moved up and down by a lever, causing the figure to appear to curtsey.

The Abbé Nollet, who paid a visit to Musschenbroek in 1736, was shown some of these mechanical slides which he considered well conceived and quotes as examples, the windmill with revolving sails, a woman who makes a curtsey in passing, a jaw which moves, and a cavalier who removes his hat and puts it on again.[10]

The magic lantern described by Pieter van Musschenbroek in his *Essai de physique* was modelled on that of 's Gravesande and could be purchased, along with the slides just described, from his brother Jean van Musschenbroek, a scientific instrument maker in Leyden. They are advertised in a list of *'diverses machines, de physique, de mathématique, d'anatomie, et de chururgie,'* appended to the *Essai de physique*. The entries referring to the lanterns and slides are worth quoting in full. Translated, they read as follows (the prices are in florins and sous):



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A big magic lantern, very artistically made, fitted with various large lenses and reflector, with well-made slides. Tom.1., Pl.47, fig.3.* 10-0

A wooden stand for this lantern 15-0

Another magic lantern similar to the above but much smaller, with 50 small slides 45-0

Various moving slides for the above lanterns, such as a mill, a lady who curtsies, &c. each 3-10

*This reference is to the description of the instrument given by W. J. 's Gravesande in his *Elementa physices mathematica*, Leyden, 1725.

We know of other instrument makers of the 18th century who advertised magic lanterns on their trade cards, but the above list is probably the earliest reference to the sale of slides with mechanical movements.

The method of painting lantern slides and the preparation of the colours, is briefly alluded to by Ozanam:[11]

The little figures are painted with colours diluted in varnish, which is nothing but fine turpentine dissolved in spirits of wine (ie alcohol) or some good brandy. These diluted colours are applied to the glass with a brush, and ordinary thick ink, or Indian ink, is used for the black.

More precise instructions for painting slides were provided by Guyot:[12]

The subject to be painted is first drawn on a piece of paper which is then secured at each end to the glass to prevent it from moving. The outline of the drawing is then painted on the glass from the other side with black paint mixed with varnish, or if the painting is to be as perfect as possible, some of the outlines should be painted in their proper colours, provided they are the strongest tint of those colours that are used. When the outlines are dry, the rest of the picture is painted, using colours mixed with strong clear varnish. Not more than four or five pigments should be used, such as blue, red, green and yellow, although a great variety of tints should be employed to give the painting a more natural appearance.

Guyot also describes how to represent a tempest at sea using two long strips of glass:

Across the whole length of one of the glasses, the appearance of the sea is painted from the slightest agitation to the most violent commotion. On the other

glass is represented vessels of different forms and dimensions and in different directions, together with the appearance of the clouds in the tempestuous parts. The two glasses are slowly passed through the lantern and moved up and down with the increasing momentum until the height of the storm is reached. The whole procedure can then be reversed.

A similar kind of panorama slide, but without the movement was suggested by Benjamin Martin in his *The young gentleman and lady's philosophy* of 1781,[13] where the 'whole Proceeding of the late Coronation' is described as forming the subject of 'two or three slips of glass'. Martin also suggested that transparent objects such as skeleton leaves and certain marine plants could be mounted between glass and used as slides in the magic lantern. Another novel suggestion was the use of transparent impressions of medals. The medal was first cleaned and the surface then covered with a properly prepared solution of isinglass in spirit. When dry, this formed a kind of matrix which would be peeled off, carrying with it a transparent impression of the design represented on the medal. The resultant impression could thus be mounted as a slide.[14]

A Belgian, Etienne Gaspard Robertson (1763–1837) whose Fantasmagorie entertainment caused such a stir in Paris at the end of the 18th century, included in his 1799 patent for the Phantascope, a process for transferring on glass, leather or oiled paper, the impression of a copper-plate engraving.[15] His process consisted of a special printing ink prepared from lamp-black, white lead and oil, which was applied to the engraved copper-plate and an impression pulled from it on a piece of strong paper. This was then placed on the surface of the glass and gently pressed down with a small hand-roller. It was then gently heated over a flame and left to dry for 15 days, after which, it is claimed, a perfect impression of the print was left on the glass. The process does not appear to have been successfully applied to the commercial production of lantern slides at this time, but the idea in an improved form was later introduced by Philip Carpenter in the production of his 'Copper-Plate Sliders' where the outlines only of the subject were transferred to the glass. Carpenter's process will be discussed later on.

David Brewster gives a description of the manner in which the slides were produced for the Phantasmagoria of Paul de Philipsthal, a lantern entertainment similar to Robertson's, which was introduced into Great Britain in 1801. **'The glass sliders on which the figures were drawn,'** he writes, **'had been first covered with opaque varnish or some black pigment, and the figures had been scratched out on this dark ground by the point of a needle. By this means the figures were luminous'.**[16]

Before the introduction of printed outlines on glass, lantern slides were painted entirely by hand. The subject was either painted directly on the glass by the artist, or a drawn outline of the picture was first made of the required size, which was then placed under the glass as a guide to the colourist. Sometimes the outlines were painted directly on the glasses by draughtsmen and passed on to others for colouring. Often the colours were painted on the reverse side to that of the outline so that the latter could be afterwards erased. Slides were painted either with pigments ground in Canada balsam and mixed with varnish, or with water-colours which were afterwards varnished. The former method was the one most commonly used. Many early 19th century hand-painted slides are beautifully executed and even some of the cruder examples have a primitive charm not unlike the caricature prints of the period.

Very few of the painters on glass for the magic lantern are known by name. A few slides are signed by initials only, but the vast majority are anonymous. A slide may have a name stamped on the frame or a printed label pasted on it, but this generally refers to the manufacturer or dealer and rarely to the name of the painter. The earliest painter of slides of whom we have a record, is Robertson, a few of whose slides are preserved at the Conservatoire National des Arts et Métiers in Paris. Philipsthal too probably painted many of his own slides, but none are known to be extant.

A pupil of Philipsthal, Henry Langdon Childe, was another well-known painter of slides, who was particularly noted for his ingenuity in devising special effects. He was the first to introduce 'dissolving views' and was also the originator of the slide known as the Chromatrope. This was a mechanical slide which produced an effect similar to the patterns seen in the Kaleidoscope. It consisted of two glass discs, painted in brilliant radial designs, which were revolved in opposite directions, to create a series of changing patterns. The effect was further enhanced by the continuous alternation in the colour scheme brought about by the overlapping of colours as the two glass discs revolved. The name 'Chromatrope' is said to have been given to it by Dr. Bachhoffner, the first scientific lecturer at the Royal Polytechnic Institution in Regent Street, London. Many of the effect slides devised by Childe were later commercially produced by the leading opticians, and earned for Childe the title of 'The Father of Mechanical Lantern Effects'. The Chromatrope was invented about 1839 and among the first to offer it for sale on the open market was C. W. Collins, a scientific instrument maker to the Royal Polytechnic. Dissolving views and Chromatropes were among the goods offered for sale in Collins' 1845 advertisement (8) in *The Art-Union*[17] and a typical selection of the other subjects produced by Childe is contained in an advertisement for 'Childe's New Series of Dissolving Views' at the Theatre Royal, Adelphi, in 1837:

Moonlight Scene – Ship at Anchor – Moorish Battlements – Perspective Grove – Italian Abbey – Moonlight – St. Paul's Church, Bankside, with the effects of a Rainbow – Roslyn Castle – Interior of St. Peter's Rome – Dungeons of Chilon, Entrance to Ivara – Tomb of Abelard and Heloise – Grove Scene – Abbotsford, Seat of Sir Walter Scott – Dumbarton Castle – Place of Internment – Thames Tunnel – Romantic View near Geneva – Napoleon's Tomb – Water Mill, (Summer) Ditto, (Winter) – Cupid and the Feather, or Love is the Lightest – Passion Flower – Beautiful allegory of the Magic Rose, or the Birth of Cupid – Hearts of Oak, or The Birth of a British Tar – Lord Nelson crowned by Fame – The Polar Regions with Captain Ross – View of 'The Victory', in 1830 Lat. 70 North, Long. 92 West – Esquimaux village, and the wonderful effects of the Aurora Borealis.[18]

Many of the subjects listed above, found their way into the opticians' catalogues and quite a few will be recognised by present day collectors. A number are represented in the Barnes Collection.

Another well-known slide painter of the period, was W. R. Hill, who began his apprenticeship with Henry Langdon Childe and later went into partnership with him as Childe & Hill. Together they produced many fine slides for the Royal Polytechnic Institution in Regent Street. The first slide painted by Childe for that Institution was *The Ruins of the Forum, Rome* and the first by Hill was *Rome from the Tiber.* In 1866, the partnership of Childe & Hill was wound up and Hill went into business on his own account, later to be joined by his son as W. R. Hill & Son.

The principal paintings and mechanical effects produced at the Polytechnic from 1866 onwards were the work of Hill. As an example of his work, we quote the churchyard scene from the story of *Gabriel Grubb.* The original design was supplied by the artist R. P. Leitch and painted for the lantern by Hill in sixteen slides, comprising one view and fifteen effects:

There are goblins coming out of graves, leaping over tombstones, streaming out of windows, standing on their heads and sinking into the ground. Illumination of windows and clock faces, Gabriel himself in a number of different positions of surprise and terror, and at the close of the scene the whole picture moves, and we appear to travel down through the earth to the goblins' cave, passing through the various strata of unmentionable objects such as we might expect to find in churchyard mould. In the same set Mr. Hill also introduced a panorama, the glass of which is 38 inches by 8 inches, illustrating Gabriel's walk from the village to the old abbey church.[19]

The Polytechnic Institution was opened on 6 August, 1838 and closed on 10 September, 1881. During the whole of this period spectacular lantern entertainments were a regular feature of its diverse attractions. Some of the best painters on glass were commissioned at one time or another to paint the slides, most of which were of a very large size in comparison with those produced for the regular market. They averaged 8½ x 6½ inches, which when framed measured 12 x 10 inches.

Edmund H. Wilkie, one-time scenic artist to the Polytechnic Institution and a relative of the famous Royal Academician Sir David Wilkie, has provided us with a list of the artists who painted slides for the Polytechnic, including the number of slides painted by each.[20] This list was compiled from the original stock list of the Institution which included the whole of the large size views and effects in the possession of the proprietors six months prior to their sale in 1882 at which the stock of the Polytechnic was liquidated. Some of the names, as Wilkie himself points out, are the names of firms and not artists. The list is as follows:

Clare	88	Miss Staunton	3
Doubell	50	Porter	21
Perrin	44	Frez	49
Smith	38	Green	13
Benwell	10	Finden	15
Knott & Baldwin	22	Childe & Hill	927
Prout	12	Unclassified	287
Winzar	2		
		Total	1581

Thirteen years after the close of the Polytechnic, 57 of the slides, then owned by Edmund Wilkie, who had bought the choicest slides in the sale described above, were shown at a special performance at the headquarters of the Lantern Society in Hanover Square, London, on 26 November, 1894. Two of the old optical lanterns which were once in use at the Polytechnic were used for projecting them. These lanterns were described as being 'constructed on cast iron foundations, having metal bodies with 9 inch compound condensers, with an

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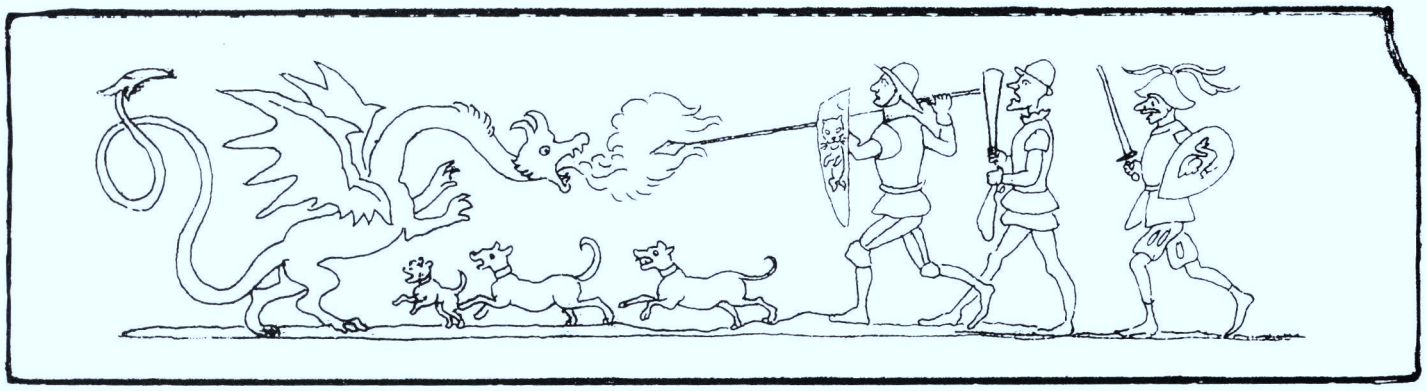
DISSOLVING VIEWS and CHROMATROPE, PROTEOSCOPE, PHYSIOSCOPE, and OPAQUE MICROSCOPE, the invention of R. S. Longbottom, Esq., manufactured by C. W. COLLINS, Instrument Maker to the Institution. C. W. C. begs to inform the scientific world that he can supply the above, and all other kinds of Optical and Philosophical Instruments, at the Royal Polytechnic Institution, London.



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auxiliary collecting lens of 4 inch diameter, non-achromatic objectives of 12 inch focus and 6 inch diameter, jet tubes which led from the side of the lantern, and clockwork for rotating and raising the limes...'[21] When one remembers the large size of these Polytechnic slides, it is immediately realised that only lanterns with extra large condensers would be capable of showing them. This nostalgic performance was probably the last time that these magnificent slides were projected.

The slides painted for the old Polytechnic have long since been dispersed. A few are preserved at the Science Museum, South Kensington, and others at the Museum of the History of Science at Oxford. No doubt others are in the hands of private collectors. A number of slides which probably once belonged to the Polytechnic are in the Barnes Collection.

Some of the artists associated with the Royal Polytechnic also painted for the regular market. Childe painted for E. G. Wood. Charles Smith worked for W. Airs of Clerkenwell, London, for whom he produced a series of pictures in outline taken from the works of eminent painters. E. T. Green stage-managed and painted the scenery for the life model slides of York & Son.

During the Victorian era, the painting of slides became a popular pastime for amateurs. Their needs were specifically catered for by the leading colourmen such artists' as Brodie & Middleton, J. Barnard & Son, and Winsor & Newton, all of whom supplied colours specifically prepared for the purpose and published detailed instructions on how to paint on glass for the magic lantern.[22, 23, 24]

Slides with only the outlines of the subjects printed upon them could also be purchased, to render the task of painting the slides more simple (9 & 10).

Printed outlines on glass had long been adopted by the trade and their use was a contributing factor to the growth of the industry. The first successful process had been introduced shortly after 1820 by Philip Carpenter with his *copper-plate* sliders. An account of the method he used is briefly contained in the official catalogue of the Great Exhibition of 1851 and reads as follows:
The outlines of the subjects are engraved on copper plates and the impression is received from these on thin sheets of glue, and then transferred to a plate of glass, the impression being burnt in the same manner as is effected in earthenware.[25]

Since the majority of Carpenter's subjects were chosen for their scientific and educational value, the printed outline ensured a reasonable accuracy in the mass production of the slides. For the most part, they were handsomely painted too and they now rank among the finest of the commercially produced slides of the 19th century.

Once a practical method of obtaining a printed outline on glass had been achieved, high quality slides could be commercially produced at a reasonable cost and in vast numbers. The majority of the painted slides extant today were produced in this way. The glasses bearing the printed outlines were often farmed out to anonymous artists for colouring at home, some of whom worked in the most straitened circumstances. This is particularly true for the less intricately painted slides such as the 'comic slippers' which were produced in their thousands and are generally more crudely executed. The old method of painting the slide wholly by hand often resulted in a primitive charm, much admired today, but which is entirely lacking in the printed outline method. It should be remembered however, that Victorian taste was more attuned to the academic than it is today and the printed outline guaranteed a more acceptable representation.

A less pleasing method of mass producing slides was the chromo-litho process, in which the design was first printed from stone on a sheet of paper, in the manner of the ordinary lithograph, and afterwards transferred to glass. J. Barnard & Son introduced a series of slides made by a transfer process in about 1865, which were termed 'Patent Enamel Slides'. Some time later they also issued chromo-litho pictures on sheets of paper which could be transferred to glass by those wishing to make their own slides. The procedure was as follows:
The litho design was first coated with 'glucine' and allowed to dry for two days. It was then immersed in cold water for a few seconds and the coloured surface then laid on the glass and rolled well down with a roller to exclude air bubbles. Next the paper was carefully removed and the resultant transfer was washed with a camel-hair brush and clean water. A sheet of blotting paper was then placed over it and after being rolled down, left to dry. Finally, after removing the blotting paper, the picture was carefully varnished with Chinese varnish.[23]

The most prolific producer in England of coloured lithographic slides was J. Theobald & Co. In a catalogue of 1887, the slides are described as being produced by a new lithographic transfer process: 'The pictures are printed from stone on to paper, and from paper transferred by means of various chemicals to glass.' A correspondent for the *Optical Magic Lantern Journal* describes a visit he made to the works in 1892. The firm had recently moved from their original premises at Nos. 6 & 7 Bath Place, Kensington, to No. 43 Farringdon Road, London, E. C. After pointing out various features of the establishment, the correspondent goes on to describe the slide department:
Ascending still higher, we entered the next floor, which is at the top of the building, this floor is of greater interest than either of the previous ones, for here the transferring and mounting of slides was being done by a large staff. As water plays an important part in this department, many of the tables were provided with a gutter immediately below the edge of the sides. Going down one side of the room we observed a very interesting division of labour. The glasses having been washed, were passed on to the next table, when they were polished with paper, and racked up; these racks, as soon as full, were passed to the next table, which had large vessels containing what appeared to be gelatine.

The chromo transfer backed with paper, was, after being coated from this vessel, stuck on the glasses and placed in a rack; these, as soon as dry, were passed on to the next table and immersed in water. After soaking for about five minutes, the paper backing was detached, and the slide again placed in a rack to dry. At the next table, a cover glass was placed upon each picture, and the binding strip gummed on the edge. Every now and again the pile of finished slides was taken away to the sorting department, boxed, labelled, and stored along the sides of the room, to eventually be placed in the lift, which conveys them to the packing room, and thence to the basement. We are informed that a consignment of 200 gross of assorted sizes of glass for slides, was delivered each week throughout the year.[26]

By that time (1892), Theobald, & Co. was the only firm in England still producing chromo-litho slides and a staff of twenty assistants could turn out 2000 of these completed pictures in a day.

For those who wished to transfer their own pictures to the glass, the chromo-litho sheets could be purchased for five shillings (25p) each. All that was required for transferring the pictures was a bottle of 'transine' and 'litheine cement', price six pence per bottle.[27] Towards the end of the century, very cheap chromo-litho slides and transfer

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Mahogany Frames, 6d. each. Black Varnish, 6d. per Bottle. Guard Glasses, 6d. per doz.

SPECIMEN OF THE OUTLINES ON GLASS

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sheets were flooding the market from Germany, most of which were directed at the juvenile trade.

We have briefly described, thus far, slides under three main headings; hand-painted, hand-painted over printed outlines and chromo-litho, and now turn to our fourth, and final, category – that of the photographic slide.

The first photographic lantern slides were made in 1849 by the brothers W. & F. Langenheim of Philadelphia. These were produced on glass by an albumen process and called *Hyalotypes*. The pictures measured about 3 inches in diameter and were first exhibited in England at the Great Exhibition which opened in May 1851.

In the same year, A. Ferrier of Paris introduced stereoscopic positives on glass using a similar process. A series of views of the Alps and other parts of Europe were prepared, which enjoyed an immediate success in conjunction with Brewster's stereoscope. Some of these photographs were acquired by J. B. Dancer, the well-known optician of Manchester, who turned them into lantern slides by cutting the plates in half and dissolving away the white wax with which they were backed. They were subsequently exhibited at the Manchester Mechanics' Institute, and apparently unaware that the Langenheims had already made photographic lantern slides in 1849, Dancer was given the credit of inventing them.[28]

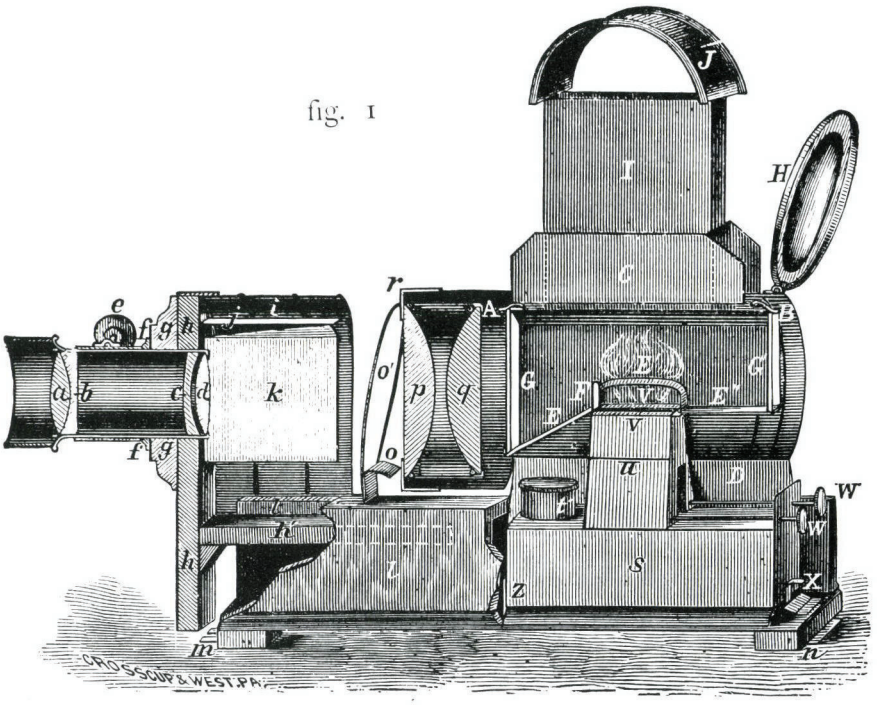
Among the first photographic slides commercially produced in England, was a series called *Highley's Science and Art Photographs for the Magic Lantern*, which appeared in 1856. Their maker, Samuel Highley, was a manufacturing optician in London who specialised in optical projection and is said to have designed the first bi-unial lantern with dissolving taps for limelight. His photographic lantern slides of 'natural objects' were highly commended by Prof. J. H. Pepper (of *Pepper's Ghost* fame).[29]

Another early series of photographic lantern slides was a series of statuary, issued by Negretti & Zambra. One might think that this was rather a dull subject to be commercially successful, but in fact it proved otherwise and was quickly imitated by other opticians. The effect was said to be greatly enhanced by projecting the black and white photographs through coloured filters and the slides were advertised with this in mind. For instance, the London Stereoscopic & Photographic Company, in a catalogue of 1868, lists a series of statuary slides of works by celebrated sculptors and adds that 'a very charming effect is produced when exhibiting Statuary by the use of the Company's Sapphire and Ruby Tints, which may be used with one or two lanterns.' The tints were available in frames at 4s. 6d. each (22½p). A further series of slides is also listed comprising upwards of 150 slides of statuary from the Crystal Palace. This practice of projecting black and white photographs through coloured filters eventually became so popular that many lanterns were made with tinter-slots in the front lens tubes, into which pieces of coloured glass or gelatine could be inserted.

Besides the subjects mentioned above, engravings and works of the most eminent artists were also photographed, as well as illustrations of popular stories and fables. These were often handpainted in the manner of the printed outline slides, for which they can be easily mistaken. One of the earliest series in this respect was shown at the Royal Polytechnic Institution in 1857 by Professor Pepper, and represented photographs of original drawings by George Hine, illustrating the story of *Blue Beard*.[30]

Although the application of photography to the production of lantern slides was ultimately to have a far reaching effect on magic lantern design and on the lantern trade in general, for the first thirty years or so, since their first introduction in 1849, photographic slides made very little impact on the conventional market. In fact, photography got off

fig. 1



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to a slow start as far as the lantern was concerned. Then, towards the end of the 1870s, two events occurred which rapidly changed the situation. One was the successful introduction of the gelatine dry plate process of photography and the other, the introduction of a new type of optical projector.

Before dry plates became readily available, photography had been rather a complicated and laborious affair, practised only by professionals and the dedicated amateur, but with this simpler process it became an attractive pastime for the layman. As if in anticipation of this new trend in photography there appeared, in 1872, a new optical lantern invented by L. Marcy of Philadelphia (11). It was called the Sciopticon and was fitted with a double combination objective, modelled on the Petzval photographic portrait lens, a double condenser comprising two plano-convex lenses in a brass cell and an open type slide-stage. Moreover, it was designed for an entirely new lamp fueled by paraffin, or kerosene. The Sciopticon was as revolutionary in design as Philip Carpenter's improved phantasmagoria lantern had been in the 1820s. Furthermore, the Sciopticon was ideally suited to the projection of photographic lantern slides. Before its appearance lanterns were made with non-achromatic objective lenses which were quite incapable of revealing the fine detail of the photographic image and whose shadows were often too dense to be penetrated by the old type oil lamps then commonly in use. The new photography and the new lantern ushered in a new phase in optical projection. The old 'magic' lantern became the 'optical' lantern and the old painted scenes gave way to the photographic image.

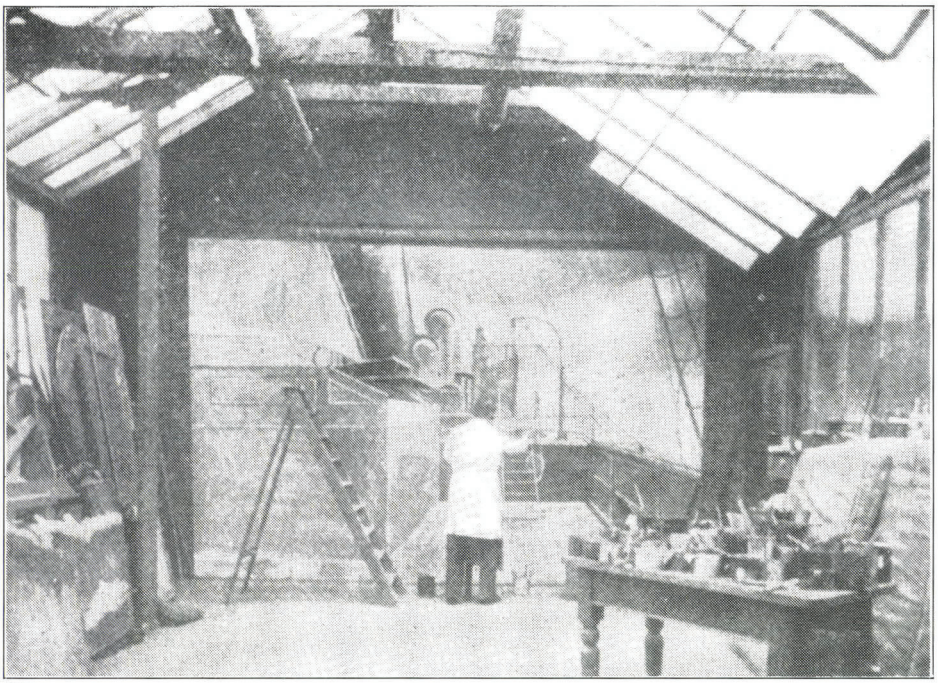
With the appearance of the Sciopticon, the leading lantern manufacturers quickly adopted its main features and one can safely assert that any lantern with a double combination objective, a double plano-convex condenser, an open slide-stage, or a paraffin lamp with its own combustion chamber and chimney, dates from 1880 onwards. These are the lanterns most commonly to be found today and which are frequently offered for sale by antique dealers.

It may be pertinent to add that handpainted slides were not suited to lanterns of the new design, for they showed up every little imperfection in the artist's work. When such slides are projected today, they are seen to much better advantage if an old-type lantern is used.

To begin with, photographic lantern slides were mounted like conventional slides, in wooden frames. They also varied in size. But shortly after 1880, a standard size was adopted, which in England was 3¼ inches square. Some countries adopted a different size. In America it was 4¼ x 3¼ inches, whereas on the Continent slides usually measured 10 x 8.5 cm. The photographic image was generally printed up to the edge of the glass so that any shaped mat could be used. This paper mat was placed on the emulsion side and a cover glass placed on the top and the edges of the two glasses bound with a gummed paper strip. By this time, the wooden frame was dispensed with and a double slide-carrier used instead. In England, the 3¼ x 3¼ inch slide is the one most commonly found today, and almost all of them were made after 1880. They were produced in millions and most were photographic views of various parts of the world. A high percentage of them were made by amateurs, but there were numerous firms who specialised in them, notably, J. Valentine, York & Son, G. W. Wilson & Co., and James Bamforth. Many of their slides were hand tinted, a practice frowned upon by photographic purists, but one which was very popular with the public and so considered well worth the extra cost and labour, since no successful photographic colour process had yet been invented.

The first form of carrier used for standard slides was a simple wooden frame open at the top, into which the slide could be dropped and then afterwards removed so that another could take its place. But this unsatisfactory method was soon discarded and a double-carrier adopted instead. This consisted of a wooden frame with a free-moving cradle inside, for holding two slides at once. The frame supporting the cradle was placed in position in the slide-stage of the lantern where it remained undisturbed. The cradle could then be shifted to and fro allowing the operator to empty and replenish it from alternative sides of the lantern. This insured a quick and smooth change from one slide to the next and prevented any tiresome interruption between changes. Many refinements were subsequently added, of which several examples are represented in the Barnes Collection. Such carriers made the use of the conventional fixed frame quite unnecessary and the slides could now be stored in neat slotted boxes, in a fraction of the space and with an appreciable reduction in weight.

Hitherto, standard slides have been somewhat neglected by the serious collector, but if one has the time and patience to sort through the thousands that are offered for sale on every hand, one is occasionally rewarded with subjects of unusual interest. This is particularly the case with *life model* slides, those static photo-plays in which actors 'froze' against painted or natural scenes, in illustration of some popular Victorian ballad or temperance tale.



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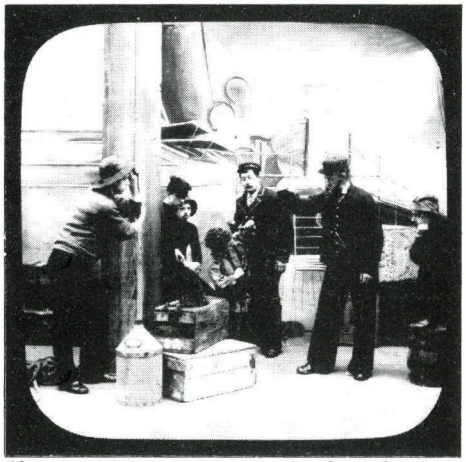

13 *Mike Smith Collection*

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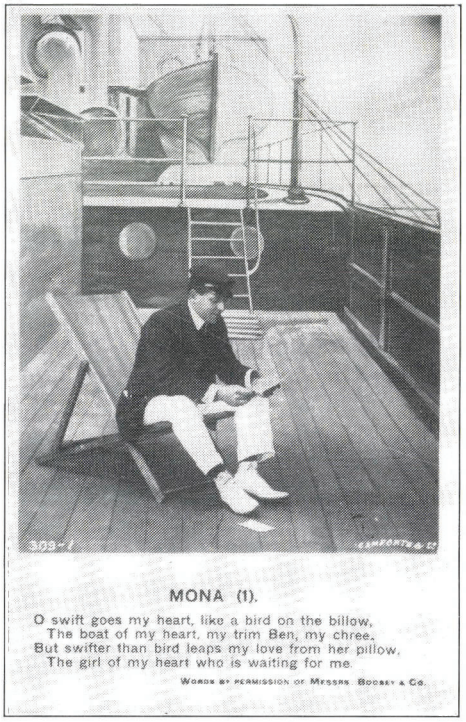

The date at which the first of these life model slides were produced has yet to be established. It is certain, however, that the genre was fully-developed by 1878 in which year the *Magic lantern manual*[28] described York's life model *Gabriel Grub* set.

In the light of this the claims of Terry Ramsaye,[31] the American historian of the cinema, that Alexander Black's *Miss Jerry*, first publicly shown in New York on 9 October 1894, was the first life model 'picture play', must be discounted.

Some idea of how these slides were staged is given in J. Hay Taylor's account of his visit to York & Sons to watch the production of *The Farmer's Fright*.[32] A set of these slides is preserved in the Barnes Collection.

Another firm which specialised in this type of work was Bamforth's of Holmfirth, Yorkshire, which began to produce life model slides in about 1888. Its founder, James Bamforth, painted many of the scenes himself, posed the characters and supervised the photography. The method by which he produced these static picture plays is recounted in *The Photogram* for February and March 1899,[33] where an illustration of the studio is also to be found (12), showing work under way on one of the background paintings used in *Little Hero* (13).

The life model studio is a room of 31ft. by 18ft., with a scene-dock and a property room at each end; and with roof-light and side-light at both sides...

...The backgrounds are sometimes painted flats, but more often they consist of flats combined with a good deal of built-up structure. The flats are 14ft. by 10ft., on stretchers (both sides used), and are painted by Mr. Bamforth from all sorts of originals – photograms, sketches, book-illustrations – as well as from original designs. Generally they are painted out after being used for a few subjects only, and sometimes after serving as the original for only one slide. Of backgrounds that can be used in various stories, however, a stock of at least a hundred is kept...

The subjects chosen for illustrations are varied – pathetic, dramatic or humorous. In some cases the poems or stories are written especially for illustration (Mr. Bamforth holds twenty-six such copyrights), but generally the illustrations are to well-known poems or tales...

With the decline of the lantern trade at the turn of the century, Bamforth turned to making picture postcards, calendars, etc., for which the firm is still noted today. Many scenes from Bamforth's life model slides were afterwards issued as postcards. We illustrate a card of this type from the four card set *Mona* (14) which will be seen to be using the *Little Hero* background noted above.

From about 1890 onwards, many hundreds of different life model sets were issued, mostly by Bamforth and York. They are of particular interest because they were to have a profound influence on the early film makers, who not only made use of similar themes, but also copied their methods of production, both in technique and staging. The account of the visit to York's studio, referred to above, could almost equally well apply to a visit to an early film studio. In fact we find many former lantern slide makers among the early film pioneers. A case in point is Bamforth himself, who began making films in about 1900.

Ironically, it was the cinema which caused the demise of the old lantern trade; but on the other hand, it was from the magic or optical lantern that the cinematograph projector evolved, and also the photographic enlarger. The modern slide projector and photographic colour transparencies are the present day equivalents of the lanterns and slides of former times.

Extracted from the introduction to the projected third volume of the catalogue of the Barnes Collection. The illustrations have been provided by the Barnes Museum of Cinematography *unless otherwise noted.*

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