The Luminous Colours of the Magic Lantern
Shedding Light on the Palette of Life Model Slides

Bart G. Moens

The heyday of the magic lantern was a visually exciting time.[1] By the turn of the twentieth century visual technologies such as photography and colour printing techniques underwent rapid innovations. Thanks to synthetic and affordable pigments and dyes, as well as oil paints in tubes, new pictorial languages emerged. Besides magic lantern shows, other types of colourful media entertainment and popular attractions, such as panoramas, dioramas and the cinema, made extensive use of colour in their visual practice (Yumibe, The Phantasmagoria).[2] Coloured lantern slides are omnipresent in many lantern slide collections. Colour obviously does add visual qualities to the medium and can serve as a means to support the expression of emotions. The latter can be observed when we compare a monochrome slide (Fig. 1) of a melodramatic life model slide series by York & Son called *Little Jim*, which depicts the story of a boy and his mother at his deathbed, with its carefully tinted counterpart (Fig. 2).

Nonetheless, a popular expression within lantern circles at the time was: "A lantern slide colored is a lantern slide spoiled" (Bagshaw 147). Where then does such a popular saying come from? To find an answer to this question, I will analyse several issues in this contribution. First, there are the technical aspects of the matter, which requires specialized knowledge of the historical perception of colour as well as understanding of the materials and techniques regarding the production process of lantern slides. Second, and moving from the technical to the aesthetical, I focus on the use of colour in a particular genre of fictional slide series, so-called life model slides, in which colour plays an important role.[3] This combined approach allows the technical and aesthetic potential of the medium and its wide diversity in both its technological context and its cultural environment to be explored, as well as the colour palette of life model slide series to be investigated for the very first time.

Fig. 1. Slide 5 of *Little Jim*. (York and Son, 6 slides, 1885)
Collection 2018 Nicholas Hiley, Lucerna Magic Lantern Web
Resource, lucerna.exeter.ac.uk, item 5022074.
Accessed 6 November 2019

Fig. 2. *Slide 5 of 'Little Jim'* (York & Son, 6 slides, s.d.).
Collection Bart G. Moens

A colourful medium

Discoveries in optics during the second half of the seventeenth century were crucial for both the study of colour and for the development of the art of projection. While experimenting with the refraction of light through prisms, Isaac Newton (1643-1727) demonstrated that white light consists of a range of colours: the visible spectrum. It is believed that around the same time, Christiaan Huygens (1629-1695) discovered the principle of projecting transparent images by means of an instrument. This apparatus would develop into what would become known as the magic lantern, or later as the optical lantern, and which was to entertain and inform people for the next three centuries. The instrument consisted of a light source within the body of an apparatus that was combined with an optical system so as to project a transparent image applied on a glass plate —known as a lantern slide—onto a larger screen.[4]

Light and colour both lie at the core of the functionality of the lantern and contribute to its power to attract and astonish spectators. From the second half of the seventeenth century, transparent hand-painted images on glass slides were projected onto white walls and screens, producing images in which the smallest details could be magnified. In a darkened surrounding, these images astounded the audience with their bright and luminous colours. The projection of colours contributed to the magical resonance of the medium, according to the physicist Pierre Le Lorrain (1649-1721) in his *La Physique occulte ou Traité de la baguette divinatoire* of 1693: "On tend sur la muraille un drap blanc, sur lequel les fantômes des objets se trouvent peints avec des couleurs très belles, et d'une grandeur gigantesque et monstrueuse" (qtd. in Mannoni, Le grand art 73).

Technically, the projection process of the magic lantern involved the so-called subtractive system in which the light, or wavelengths of light, emitted by the light source were selectively absorbed by the colours applied on the glass plate—which acted as a filter—and subsequently transmitted through the glass plate to be finally reflected onto the screen.[5] Thus, a slide coloured entirely with red transparent paint transmits a red colour and absorbs all the other colours. Although the colourful properties of these projected images were an essential aspect of a lantern show, the lantern performance also consisted of spoken words and was often synchronically performed with music, which made it into an audio-visual *dispositif*. Notwithstanding the fact that magic lantern shows offered spectators a multimodal experience that addressed the different senses, in this article I focus on one aspect of the visual potential of the medium, namely, the use of colour in lantern exhibitions.

Colour and the production of lantern slides

Various types and shapes of lantern slides were produced and projected in many different contexts, including child and adult entertainment, illustrated lectures of a religious or political nature, and scientific projections.[6] Based on production techniques, three stages in the manufacturing of these lantern slides can be distinguished: painting, printing and photographic techniques, which are all directly linked to the application of colour (Frutos 3). The earliest magic lantern slides were painted by hand, usually in watercolours or oils, on thick glass that often contained irregularities. At the time, watercolours were preferred to oils for their greater degree of transparency and shorter drying time. These images were projected and narrated by itinerant showmen, and the quality of the projected images was generally poor in comparison with slides produced later due to the opaque nature of the paints, weak light sources and unrefined lenses of the lanterns (Mannoni Le Grand Art 7, 105, 112). Little is known about the makers of these early slides; they could be renowned painters, miniaturists or simple craftsmen (Mannoni Le Grand Art 115).[7] In general, it can be said that, compared to the study of the material development of early cinema, for example, there is an important absence of documentation and resources as regards the production of magic lantern slides and their manufacturers.

From the nineteenth century onwards, the artisan production of slides was gradually replaced by a more industrialised production and mechanical reproduction print techniques. These technologies were developed for other media, such as the printing press, and made the production of lantern slides on a large scale commercially viable. The copperplate method, for example, made use of black ink mixed with varnish on the plate to print image outlines on the glass. The colouring, however, was most-often still done by hand within the printed outline to ensure a certain quality. Another printing technique was lithography or stone printing. Usually, a porous limestone in combination with an inked grease-treated image was used to print slides. Lithography later developed into chromolithography, which allowed for the combination of different coloured inks to form a multi-coloured print, and really paved the way for the mass production of lantern slides, particularly for toy lanterns (Roberts 10).[8] In Britain, full-colour printed slides were first commercially produced around 1870, although the quality was rather poor. The chromolithographic process was also used for printing colourful images on transparent paper, which could be placed between two glass plates, and thus be projected. These so-called *vues chromolithographiques* (Fig. 3, 4 and 5) were sold for a much lower price than regular glass slides.[9]

Fig. 3. Slide 19 of *Un poison mortel* (TOLRA, 29
slides, s.d.). Collection KADOC-KULeuven

Fig. 4. Slide 24 of *Un poison mortel* (TOLRA, 29
slides, s.d.). Collection KADOC-KULeuven

Fig. 5. Slide 26 of *Un poison mortel* (TOLRA, 29
slides, s.d.). Collection KADOC-KULeuven

Another, even more crucial technology for the evolution of the magic lantern was photography. This is especially the case in the development of the magic lantern into the more scientific or professional lantern, the so-called 'optical lantern', which projected mainly photographic positives on glass slides. Photography had been developed several decades before the photographic lantern slide,[10] but in the second half of the nineteenth century, the albumen process made it possible to register black and white photographs onto glass plates. Albumen was used to fix photosensitive emulsions to glass with high translucency resulting in a brownish image with very fine detail. This technique was, however, soon followed by the wet collodion process, which was more stable, cheaper and faster. The latter had the advantage of reducing the exposure time to several seconds, although the production itself was rather complicated due to the fact that the plate had to be exposed while still wet.[11] The development of the dry plate process based on a gelatine emulsion in the early 1870s was improved by the end of the decade, shortly followed by industrially produced dry plates coated with a very thin gelatine-silverbromide emulsion, which were highly appropriate for projection.[12]

Different photographic processes were thus modified and used to produce lantern slides, which were particularly suited to scientific, documentary and art historical subjects (Robinson 8). The photographic images were generally monochrome, although there had been experiments with colour photography since the emergence of the medium. To produce colourful photographic images, techniques were employed that harkened back to the beginnings of the magic lantern, specifically the hand-painting of lantern slides. This method proved to be an efficient and affordable option, whilst the development of commercial colour processes in the early twentieth century was pending.[13]

The colour(ing) of the lantern slides
Commercially produced photographic slides were most often marketed both in monochrome and in colour, and tinting slides was often considered an option for aesthetic and economic reasons. As a guideline, the price of coloured slides was approximately double that of monochrome photographic slides. Film scholar Tom Gunning interprets the more expensive alternative as an indication of "added value and greater attraction" and noted that "[…] color appeared as a superadded feature, an additional sensual attraction literally superimposed over the original black and white images" (Gunning 9).

The colouring of lantern slides, and the drive to achieve similar exhilarating effects to the colourful slides from earlier periods, could also be executed by the

end-user, whether an amateur or an expert skilled in painting on glass. The most common practice was to apply colour directly onto the slides, and this was done by either the slide producers or the end-user. Slides were hand-coloured using various techniques and materials such as aniline or albumin dyes, watercolours, oils[14] and pastel crayons. By the end of the nineteenth century, various articles and manuals on how to work with the lantern were available on the market and often provided detailed descriptions on how to colour photographic lantern slides.[15] Without exception, they all pointed out the difficulty of colouring the slides, noting that the tinting of slides was laborious and required a trained hand and an eye for detail. When asked about the mysteries of his profession Chathan Pexton, a renowned English slide painter and dealer based in London, answered: "[...] we have no secrets here; we trust to skill alone, and not to any fanciful methods of mixing or applying colors" (Welford and Sturmey 327). Trained skills and know-how were thus necessary to obtain an acceptable visual result. This is strikingly illustrated in the advice given by the American lanternist and slide maker Dwight Elmendorf (1859-1829) in his *Lantern Slides: How to Make and Color Them*: "Unless one has real artistic feeling and a knowledge of tone and color, the slides had better remain as the developer made them" (59). Elmendorf concluded firmly: "In conclusion, allow the author to beseech anyone without "an eye for color" to leave coloring severely alone" (68).

Specialized hand work was done by manufacturers of slides or by artists with experience painting on glass or as miniaturists. However, Robinson *et al*. emphasized that photographic slides were not hand painted but rather "hand-coloured on a photographic outline" (230).[16] As the following quote in *The Engineer* from 1894, as cited by Frutos, illustrates: "Practically speaking, photography has about killed lantern slide painting as an art, although colourists are now numerous [...]" (10). This statement also confirms that the colouring of photographic slides was interpreted as being in the service of the photographic image rather than an autonomous practice. Nevertheless, it was common practice to tint photographic slides, particularly life model slides, and although these were mass-produced, through hand-colouring these pictures became unique images. Producers such as York & Son and Chatham Pexton & Co in the U.K. and the C. W. Briggs Company in the U.S. employed many colourists, mainly young women.[17] Borton estimates that a colourist worked between half an hour to three hours to colour one image and points out that slides that were meant to be coloured were probably printed more lightly than the ones remaining black and white (5-6). Oil-based paints were the most used but they had to be transparent; certain colours, such as vermillion, could not be employed because of their

opacity (Robinson 73). As for the colouring, the artists who tinted the images often did not follow any precise rules but instead coloured the pictures according to their own tastes (de Roo). Frequently, colours were used differently in comparable slide sets (Fig. 6 and 7), as MacDonald also observes: "It is common to find examples of the same set with completely different coloring [...]" (26). Moreover, even within one and the same set the colours could differ considerably. This is illustrated in the slide series 'The Death of Paul Dombey'—an adaptation of a scene from Charles Dickens' lengthy novel in six scenes—preserved in the collection of the Cinémathèque royale de Belgique (Fig. 6 and 8). Without additional sources, however, it is impossible to find out exactly why this is the case. Were several colourists working on the same series, or have the plates been replaced or put together later on with plates from a similar series? We can suggest several hypotheses but at this moment it is impossible to answer the question with certainty. The hand colouring of slides remained an important part of the production process until the 1920s. Later, colour photography and the trichrome printing processes, such as Kodachrome by the Kodak Company, signalled the end of professional, hand-painted colouring of photographs.

Fig. 6. Slide 3 of *The Death of Paul Dombey* (York and Son, 6 slides, s.d.). Collection of the Royal Belgian Film Archive
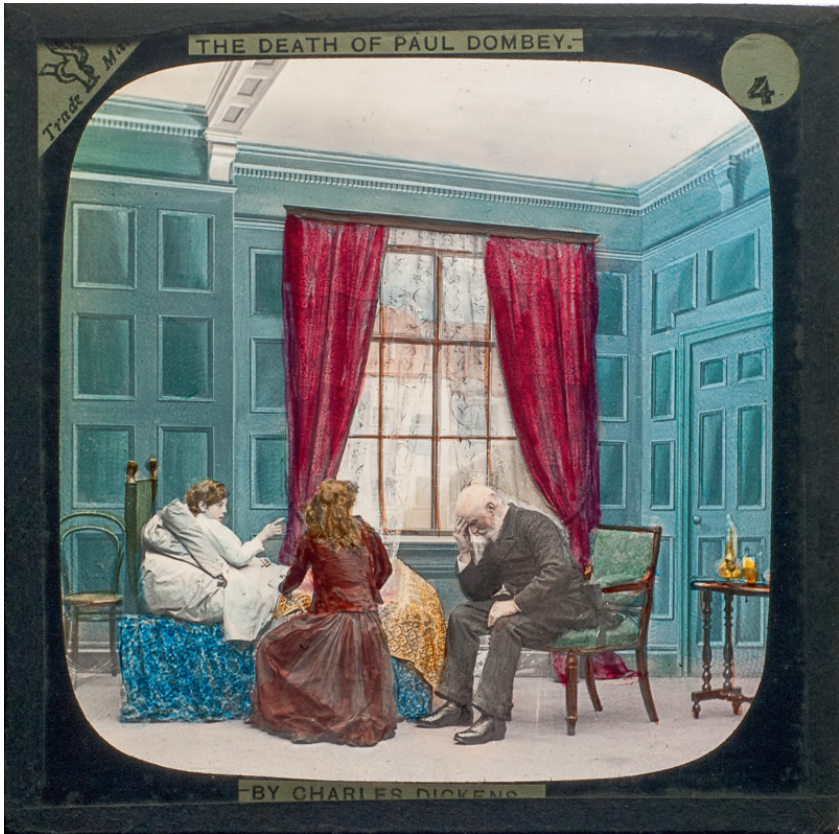
Fig. 7. Slide 4 of *The Death of Paul Dombey* (York and Son, 6 slides, s.d.). Collection of the Royal Belgian Film Archive

Fig. 8. Slide 6 of *Death of Paul Dombey* (York and Son, 6 slides, 1893). Collection Ludwig Vogl-Bienek / Media Studies, Universität Trier, Lucerna Magic Lantern Web Resource, lucerna.exeter.ac.uk, item 5021374. Accessed 6 November 2019

Photographic slides of commercial origin or homemade transparencies could also be hand-tinted by the end user. For that purpose, ready-made transparent oil paints in tubes, dyes, watercolours, inks and pastel colour crayons were available, often in complete kits. The aforementioned author of *Lantern slides. How to make and colour lantern slides* advised the use of aniline dyes (Elmendorf 59). However, by the turn of the century, albumin colours were preferred for amateurs because of their transparency and the ability to apply them more easily in layers to intensify the colours.[18] The E. Mazo company in France offered a box of 12 aniline dye colours for 16 frs.: carmine red, brown red, violet, bright yellow, orange, light green, Sienna, brown n° 2, neutral brown, *rouge ponceau, bleu verdâtre' and 'bleu violacé* (E. Mazo, Catalogue, p. 119). In addition, they sold albumin paints for 15 frs., which were softer and more delicate, and available in the following colours: red (Vermilion, Carmine, *toile*), green (dead leaf, green grass, green), blue (purple, blue water, blue sky) and brown (yellow, Siena, burnt Siena) (E. Mazo, Catalogue 120). Before applying the tints, E. Mazo's manual advised that the secret of spreading the colours lay in moistening the photographic emulsion with a solution of water and a few drops of ammonia applied carefully with a pencil (E. Mazo, Manuel 101). After the colour had been applied the painted layer was sealed with varnish, which also helped to increase the brilliance and transparency of the colour, and to protect the paint from the heat emitted by the light source (Borton 5).

The enclosed directions for colouring argued that no prior knowledge was required—the painter just had to follow the contours and shadows of the photograph. But tinting, as already demonstrated, set numerous challenges, especially for amateurs. For example, the final visual effect projected on the screen was not immediately evident when painting, as freshly applied colours on the glass plate turned out differently when projected onto the screen. As Elmendorf noticed: "If the slides are colored by ordinary daylight the effects will be rather surprising when viewed at night by means of the lantern" (67). Special retouching desks were used, consisting of a desk equipped with a glass table plate and a light source or mirror reflecting the light beneath, through which the slide could be illuminated. Elmendorf continued, emphasizing the importance of the light source with respect to the colour of the projected images due to the relationship between colours and light:

> Slides should be colored for the light used in projecting them on the screen, and used with that light and no other. After one slide has been colored successfully so that the worker is satisfied with its

effects on the screen, other slides may be colored by ordinary daylight, using this slide as a guide to color. (67-8)

Next to painting, there were also external mechanical techniques to provide colourful projected images. The magic lantern could transform uncoloured lantern slides into a single tone by making use of a so-called 'colour wheel' or a 'revolving lantern tinter' during the projection. These tinters were in the shape of a disc and could be mounted on a lantern objective and contained several uniformly tinted gelatin or glass plates to add a particular colour to the projected images and was used for colourful effects such as sunsets, moonlight, and seasonal changes. (Robinson *et al.* 273). For example, the French producer E. Mazo sold such tinters, which contained five different colors: blue, red, yellow, green and orange (E. Mazo, Catalogue 134). A similar technique involved certain lantern types that were equipped with an opening behind the projection lens or between the condenser and the lantern slide in which a colour filter, also called a tinter, could be inserted to adjust the colour scheme of the projected image (Robinson *et al.* 2001, p. 302; Yumibe, Colour as Performance 297).

Fig. 9. Chromatrope (E. Mazo, second half of the nineteenth century). Collection Cinémathèque française, PLM-00597-047

To obtain spectacular colour effects, so-called chromatropes were popular from the 1830s on (Robinson 7). These mechanical slides consisted of two glass plates painted with colourful abstract patterns and equipped with a mechanism to rotate the slides in opposite directions to create colourful kaleidoscopic images (Fig. 9). They were also called "artificial fireworks" and projected an exhilarating colour effect on the screen (Robinson *et al.* 67). Other 'effect slides' were used to display double or triple colour effects, such as a mechanical slide that could be used to simulate day, sunset and night, or, for example, a chameleon changing its colour.

Colour theories in magic lantern circles
Nevertheless, it was a common assumption at the time that "a good photograph is better without any colour at all; on the principle, I suppose, that "good wine needs no bush"", as stated by Thomas Cradock Hepworth, lecturer at the Royal Polytechnic Institution in London (145). In the *Indispensable Handbook to the Optical Lantern*, authors Walter Welford and Henry Sturmey indicated that colouring slides was a hotly debated topic within lantern circles: while some exhibitors preferred plain monochrome slides, others liked coloured ones because "Colour lends to objects a new charm - a charm which they would not possess without it", as long as the tinting is properly executed (324). A manual of the French manufacturer E. Mazo even noticed a geographical difference in the appreciation, although it is difficult to review this statement: "Les vues peintes sont toujours très appréciées dans les campagnes. A la ville, on est plus exigeant : on demande un coloris artistique" (100).

This geographical explanation seems of rather minor importance compared to other reasons for the care taken in adding colour to lantern slides. The main reason why the colouring had to be executed with great precision is probably the fact that images on the slides could be magnified up to 80 times when projected onto a screen. Mistakes and irregularities such as visible streaks or spots would thus be mercilessly magnified and would spoil a photographic slide and its realistic slant. In other words: "Colour may be so applied to objects as to render them infinitely more ugly than they were without it" (Welford and Sturmey 324).

Moreover, another explanation for the cautious use of colour comes from an aesthetic perspective. Colour is traditionally dismissed as inferior to design or drawing, which is associated with rationality, and this was certainly the case in the scientific and technological context of photography during the nineteenth century. The photographer produced a monochrome image based on principles of physics and chemistry, but then an artistic intervention was needed to give the

image a more lifelike appearance using the colours of nature. However, the realistic qualities of the indexical photographic image and its capacity to reproduce a scene in black and white directed the artistic intervention of adding colour. The colouring was largely determined by, and in support of, the qualities of the photographic image, as the following citation illustrates: "Colour assists in the separation of objects and parts of objects, and thus gives assistance to form" (Welford & Sturmey 324).

Alongside the use of colour in lantern slide projection, different colour theories were developed and particularly emphasized the combinations of colours and their possible contrasts rather than the use of specific tints (Borton 23). The importance of understanding colour theory in selecting colour combinations was ascertained by Hepworth:

> Should he be quite unused to working in colour, he had best begin by procuring some book upon the general theory of colouring, so that he may understand the difference between a primary, secondary, and tertiary tint, and may learn how to combine them together. (1888, 14)

Colours had to be subtle and elegant, as Welford and Sturmey wrote: "Colours, when placed together, can only please and satisfy the educated when combined harmoniously, or according to the laws of harmony" (325). This issue is also addressed by Joshua Yumibe in his research of the use of colour in early cinema. He writes that colours should be applied tastefully and not be overwhelming, and he also points to contemporary colour theories that espouse colours as having an influence on the sensuous and emotional experience of the viewer, which can also be applied to lantern slides (Yumibe, Moving Color 136).

Besides theoretical reflections, instruction books contained practical advice on technique and materials.[19] For example, it was important to "never try to apply another color to the slide until the first one has dried, unless blending is the object in view" (Elmendorf 67). But they also contained very specific instructions, for example: "In coloring trees, first give them a general pale tint of green and then work out each tree in detail with various tints of green" (Elmendorf 67). In an article in *The Photo-Miniature* about the making of lantern slides, cited by Borton, it was said that "[...] in lantern-slide work we are, first and last, impressionists; that is, we do not separately touch each leaf, or blade of grass, or minute detail. A slight, even wash over the whole of the mass gives it

the requisite variety and contrast of tint" (6). The directive was to avoid colouring every detail since, given the properties of the paints and the need for transparency, detailed painting was extremely difficult. The colours had to be applied evenly, although they could be adjusted on the glass slide, which is not the case in the colouring of film, for example. From the above, it is evident that the technical properties of the medium and the required techniques had a profound influence on the aesthetic outcome of the images and colours ultimately projected on the screen.[20]

Colour use in melodramatic life model slide sets: a palette of emotions?

As demonstrated, colours have always played an essential in the production of lantern slides of various sizes and shapes, which were employed for a variety of purposes. Next to technical matters, the use of colour was also closely intertwined with the stylistic and diegetic function, and with the expression of emotions. To illustrate this, I will now focus on the use of colour in fictional melodramatic slide sets, so-called life model slides. These series consist of staged photographic images of people in fictional situations with melodramatic and sentimental elements. These illustrated stories share often dramatic situations and moral dilemmas, featuring manicheistic characters and pathetic emotions. As they are photographed in black and white, the saturation of applied colours is directly influenced by the gray and black undertones in the photograph. This is clearly visible when we examine the monochrome image of a short slide series by York and Son titled 'Little Jim' (Fig. 1 and 2). Clearly, the photographic outline has a negative influence on the purity and intensity of the colours so that they appear to be more dim than primary colours. Consequently, the palette is not elaborate or sophisticated, and subtle colouring with a truly naturalistic colour gradient is simply impractical (Fig. 10). Only a handful of colours are used, which results in a dozen diluted colours for tinting the characters, props and decors to create contrasting images with a dramatic feeling (Fig. 11).

Fig. 10. Detail of slide 5 of *Little Jim* (York & Son, 6 slides, s.d.). Collection Bart G. Moens

Fig. 11. Slide 5 of *Little Jim* without backlight (York & Son,
6 slides, s.d.). Collection Bart G. Moens

At the same time, emotions are therefore expressed visually through theatrical gestures and the exaggerated positioning of the limbs of the characters. Their bodily expressions were in function of the action and intensity of the scene and were meant to attract the audience. In contrast, non-photographic fictional slide series such as chromolithographs on glass and cellophane made much more use of intense hues and contrasting colour combinations to emphasize action in still images. Their simple and uncomplicated lines—without the underlying photographic outline—were coloured extensively and expressively resulting in a visually appealing image. In these series, we witness contrast and tension through rich tones and the heightening of emotions through the use of intense and highly saturated colours (Fig. 3, 4 and 5). Another noteworthy aspect is that characters could be stereotyped through colour-use, as in this example of a drunk having a distinctive red nose in a series for anti-alcohol propaganda (Fig. 3).

Unlike many chromolithographs, the life model slides mostly made use of the advised harmonic colour combinations according to the aesthetic principles of the time in photographic circles. Therefore, the sensory and emotional experience was less abrupt and rather created a general atmosphere that supported the emotional tone of the story. A striking example of achieving such an atmosphere is the use of colour in a French melodramatic life model series of 19 slides created by Honoré Le Sablais for La Maison de la Bonne Presse, 'Noël de la petite aveugle', produced between 1910 and 1924. The dominating colour for the interior scenes is a rich and melancholic purple (Fig. 12), thereby illustrating the present sorrow filling the family house. This unrealistic chromatic emphasis is an example of the use of colour to provoke a melancholic mood that supports the emotional state of the main characters and thereby functions as a conductor of feeling towards the spectator.

Furthermore, colours were also used to improve the readability of the images and comprehension of the linear structure of the slide sequence and story. Used consistently, colours facilitate the recognition of location and the identification of characters that reappear in a slide set. As said, the interior is painted in purple, in 'Noël de la petite aveugle' while the outdoor settings are tinted in a dark blue to indicate nighttime (Fig. 13).

Fig. 12. Slide 1 of *Noël de la petite aveugle*
(Maison de La Bonne Presse, 19 slides, after 1910)
Collection Mundaneum, Mons

Fig. 13. Slide 8 of *Noël de la petite aveugle*
(Maison de La Bonne Presse, 19 slides, after 1910)
Collection Mundaneum, Mons

Fig. 14. Slide 11 of *A Gambler's Honour* (Bamforth &
Co., 24 slides, 1910). 2008 Robert MacDonald, Lucerna
Magic Lantern Web Resource, lucerna.exeter.ac.uk, item
5012841. Accessed 6 November 2019

Moreover, because of the use of a rather small number of colours, the visual complexity is reduced to direct the attention to the essential elements in the story. As a visual stimulus, certain colours are used to draw attention to specific parts of the image that support the narrative or to a protagonist. For example, the clothes of less important characters were often left uncoloured, while clothes of main characters received an eye-catching colour, as we witness in 'A Gambler's honour: and what led to it' of Bamforth & Co (Fig. 14). Another regularly used technique is applying colours to clothes to contrast with the colours of the background and the ground, in order to make the characters stand out. In this way, tinting also adds depth and structure to the image. Through the use of colours, forms stand out more clearly, specific shapes in the image are outlined, and the perspective is reinforced. Emphasizing certain lines, shapes and surfaces entails impressions of space, texture and light.

Conclusion

We can conclude that colour plays an essential role in the visual language of many different types of lantern slides, and particularly in life model slides. The bold assumption by photography purists that a coloured photographic lantern slide is a spoiled slide, is definitely not representative of the historical development of the practice of the magic lantern, as colour is a crucial factor in the production of slides and for the experience of the lantern exhibition.

Through their aesthetic qualities, colours are a vehicle for the expression of emotions and ideas. On the one hand, colour adds to realistic characteristics and to a specific atmosphere, and as such supports the emotionality of the depicted story, while on the other, colour can decrease the feeling of realism when badly executed, as shown in the case of the photographic slides. Colour thus has an immediate impact on the intensity and credibility of the projected images and can also be coded to add meaning. It is, however, difficult to track down the intended meaning of the manufacturers, given the lack of sources about the production and colouring in the case of these life model slides.

As I demonstrated, the application of tints is strongly embedded in the technological and media context of the lantern area, and it showcases strong connections between historical, technical and aesthetic factors. The stories and the iconography of the life model slides are inter-medial by nature and the colouring of the photographic slides is heavily determined by the materiality of the slides and the available transparent paints and dyes. Therefore, further research on the material and technical aspects of this type of heritage is necessary,

together with archival research in company archives and the contemporary specialized press.

Works cited

Bagshaw, Walter. "Colouring Lantern Slides with Aniline Dyes." *The Optical Lantern and Cinematograph Journal* (1904): 147.

Borton, Terry. "Outstanding Colorists of American Magic Lantern Slides." *The Magic Lantern Gazette* 26:1 (2014): 2–23.

Bottomore, Stephen, et al. "The Early Film Colorists Speak." *Film History: An International Journal* 28:4 (2016): 159–68.

Catalogue B. Projections Lumineuses: Séries de Vues. Paris: Maison de la Bonne Presse, 1927 .

Catalogue Spécial Des Appareils Construits Par La Maison de La Bonne Presse. Paris: Maison de la Bonne Presse, 1912.

de Roo, Henc. *Just a Lot of Beautiful Life-Model Sets of Magic Lantern Slides. Part 4*. Web. 28 Aug 2019. <https://www.luikerwaal.com/newframe_uk.htm?/zomaarlife04_uk.htm>.

E. Mazo. *Manuel Mazo de Projections*. Paris: E. Mazo, 1910.

E. Mazo. *Catalogue N°46 E. Mazo. Fabrique d'appareils, d'accessoires et de Vues Pour La Projection. Années 1910 et 1911*. Grande imprimerie du centre, 1910.

Elmendorf, D. L. *Lantern Slides: How To Make and Color Them*. New York: E. & H. T. Anthony & Co., 1895.

Frutos, Francisco Javier. "From Luminous Pictures to Transparent Photographs: The Evolution of Techniques for Making Magic Lantern Slides." *The Magic Lantern Gazette* 25:3 (2013): 3–11.

Groom, Edward. *The Art of Transparent Painting on Glass*. London: Winsor and Newton, 1855.

Gunning, Tom. "Colorful Metaphors: The Attraction of Color in Early Silent Cinema." *Living Pictures: The Journal of the Popular and Projected Image before 1914* 2:2 (2003): 6-9.

Hepworth, T. C. *The Book of the Lantern. Being a Practical Guide to the Working of the Optical (or Magic) Lantern*. London: Wyman & Sons, 1888.

Lavédrine, Bertrand, and Jean-Paul Gandolfo. *The Lumière Autochrome: History, Technology, and Preservation*. Los Angeles: The Getty Conservation Institute, 2013. Trans. from French by McElhone.

MacDonald, Robert, ed. *The Illustrated Bamforth Slide Catalogue (Booklet)*. London: The Magic Lantern Society, 2009.

Malthête, Jacques. "Les Bandes Cinématographiques En Couleurs Artificielles. Un Exemple: Les Films de Georges Méliès Coloriés à La Main." *1895, Revue d'histoire Du Cinéma* 2 (1987): 3–10.

Mannoni, Laurent. "La Collection Des Plaques de Lanterne Magique de La Cinémathèque Française." *Journal of Film Preservation* 82 (2010): 41–46.

Mannoni, Laurent. *Le Grand Art de La Lumière et de l'ombre. Archéologie Du Cinéma*. Édition Nathan, 1994.

Projections Molteni. Éditions de Diapositives Pour Conférences Scientifiques et Mondaines. Paris: Radiguet & Massiot, 1897.

Roberts, Phillip. "The Early Life of Philip Carpenter." *The Magic Lantern*. 2016. 10–13.

Robinson, David. "Shows and Slides." *Magic Images. The Art of Hand-Painted and Photographic Lantern Slides*. London: The Magic Lantern Society of Great Britain, 1990. 5–8.

Robinson, David, et al., eds. *Encyclopedia of the Magic Lantern*. London: The Magic Lantern Society, 2001.

Usai, Paolo Cherchi. "Color." *Encyclopedia of Early Cinema*. Ed. Richard Abel. Routledge, 2005. 138–41.

Welford, Walter D., and Henry Sturmey. *The Indispensable Handbook to The Optical Lantern. A Complete Cyclopaedia on the Subject of Optical Lanterns, Slides & Accessory Apparatus*. London: Iliffe & Son, 1888.

Yumibe, Joshua. *Moving Color: Early Film, Mass Culture, Modernism*. New Brunswick, New Jersey and London: Rutgers University Press, 2012.

Yumibe, Joshua. "Colour as Performance in Visual Music, Film Tinting and Digital Painting." *Performing New Media, 1890-1915*. Eds. Kaveh Askari, et al. New Barnet: John Libbey Publishing Ltd, 2015. 294–304.

Yumibe, Joshua. "The Phantasmagoria of the First Hand-Painted Films. How the Silent Screen Burst to Life with Color." *Nautilus*, no. 26, 2015, http://nautil.us/issue/26/color/the-phantasmagoria-of-the-first-hand_painted-films.

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[1] By the end of the nineteenth century, the term 'magic lantern' was mainly used to refer to small toy lanterns. Sophisticated lanterns used for more serious and professional purposes were called 'optical lanterns. These instruments were equipped with powerful light sources and refined optics to project large and high-quality images.

[2] In the case of cinema, many of the films produced before the First World War were also abundantly coloured, sometimes by artists who also coloured lantern slides (Usai 138; Malthête 6). For the hand-colouring of film the same expertise and techniques were used as those by lantern slide and photograph colorists, who had been colouring their images for decades (Bottomore et al. 166). Whereas Borton indicates that, due to the much smaller format and the number of images, "the coloring was often no match for lantern-slide quality" (18). Yet the hand-colouring of films was time-consuming and very expensive, therefore films would be tinted (frames uniformily coloured to mostly indicate physical features—however, in a phototographic or magic lantern context 'tinting' just means the hand-colouring of a photograph or lantern slide) or toned (the chemical colouring of the sensitized portions of the scenes) amongst other techniques such as colouring with stencils (Usai 139-140). On the other hand, delicately painted lantern slides, were used as title slides or 'vues d'annonces' during film exhibitions.

[3] A large amount of digitized life model slides can be found on the Lucerna website, an online resource on the magic lantern which is managed by lantern researchers from universities in the U.K. and Germany: http://lucerna.exeter.ac.uk/. Last consultation 14 November 2019.

[4] The optical system contained a set of lenses (a condensator) to concentrate the rays of light onto the slide, and a set of lenses placed behind the lantern slide (the objective or projection lens) to enlarge and project the transparent image.

5 The intensity of the light source has an important impact on the sharpness of the image, and as colour is relative to light, it also has a defining influence on the brightness of the projected colours and the surrounding colours. Throughout the history of the magic lantern different illuminants were used for projection: candles, oil, petrol and alcohol lamps, gaslight and electricity. In the 1820s, professional projectionists made use of gas mixtures (e.g., hydrogen and oxygen with the flame pointed to a piece of lime), to produce a strong and bright white light.

6 Scientific purposes for example to explain the colour spectrum, using a prism in front of the objective to defuse the white light of the lantern. Or for art history lectures, for which reproductions of renowned works on glass slides were coloured, and of which manufacturers such as E. Mazo boldly assured they were in exactly the same colours as the originals due to their trichrome process (Catalogue 187).

7 In his 'Le grand art de la lumière et de l'ombre. Archéologie du inema', Laurent Mannoni describes an exceptional series of slides painted by the Italian master painter Giuseppe Maria Crespi (1665-1747) that survived the time (114-5). Mannoni also refers to an announcement by Paul Philidor (17??-1829), who gave phantasmagoria shows in Paris at the end of the eighteenth century, when looking for painters: "On désireroit trouver un Peintre au fait de peindre sur verre, en miniatures et en couleurs transparents" (Le grand art 140).

8 I would also like to draw attention to the often beautifully coloured lanterns themselves, especially toy lanterns such as the tin lanterns of the French manufacturers Louis Aubert and Auguste Lapierre.

9 In 1910, such images on cellophane paper were sold by the French company E. Mazo for 3 frs. For 48 slides, with an explanatory booklet. For comparison the price of an uncoloured slide was generally between 0,50 and 0,60 frs. And a coloured slide between 1,5 and 1,75 frs. A slide made with a colour photograph was 2,50 frs. For 1 slide (E. Mazo, Catalogue).

10 The first photographic lantern slides were manufactured by the U.S. based Langenheim brothers; after projecting daguerreotypes using a setup with two limelights, they modified Niépce's process in 1848 to produce positive pictures on glass for projection in 1848 (MacDonald 8).

11 The wet collodion process was used by English manufacturers of life model slide series up until the twentieth century. Given the fact that pictures were taken in studio conditions with controlled light conditions and close to the darkroom, the disadvantages were limited.

12 Along with being low cost and user-friendly, the industrially produced dry plates coated with a very thin gelatin-silverbromide emulsion boosted the commercial production of lantern slides by major companies such as Agfa (c. 1873) and the Eastman Kodak Company (c. 1888), amongst others (Robinson et al. 231-232).

13 Following the experiments of pioneers such as Edmond Becquerel (1820-1891) and Gabriel Lippmann (1845-1921), the Lumière brothers commercialized the first process for colour photography, called the 'autochrome process' (Lavédrine and Gandolfo 94). At the beginning of the twentieth century, colour photography emerged and was also used to produce lantern slides. In their catalogue for the years 1910 and 1911, the E. Mazo company proudly presents their "trichromies", named after the process developed by Auguste Jean-Baptiste Tauleigne (1870-1926) (Catalogue 187).

14 These are the same products used by oil painters, but the colourist of lantern slides was confined to those colours which are naturally transparent: Prussian blue, indigo, Italian pink, raw Sienna, yellow lake, Chinese orange, neutral tint, brown pink, brown madder, rose madder, purple madder, crimson lake, ivory black, burnt Sienna and McGilp (Hepworth 148).

15 Elmendorf, D. L. (1895). *Lantern Slides: How To Make and Color Them*. New York: E. & H. T. Anthony & Co; Hepworth, T. C. (1888). *The Book of the Lantern. Being a Practical Guide to the Working of the Optical (or Magic) Lantern*. London: Wyman & Sons; Welford, W. D., & Sturmey, H. (1888). *The Indispensable Handbook to The Optical Lantern. A Complete Cyclopaedia on the Subject of Optical Lanterns, Slides & Accessory Apparatus*. London: Iliffe & Son; Groom, E. (1855). *The Art of Transparent Painting on Glass*. London: Winsor and Newton. And several articles in the specialized press, such as in The Optical Magic Lantern Journal.

16 Although mass production and economic reasons were often implicated in the decline in the quality of the images and their colours, professionally painted slides were still made and were sometimes real works of art in themselves. A stunning example are the slides currently in the collection of the Cinémathèque française, which were made for the Royal Polytechnic Institution by professional slide painters, and which excel in bright images with overwhelming colours (http://www.laternamagica.fr/ Last consultation 14 November 2019).

17 In an article on lantern slide manufacturer Chatham Pexham & Co, their colouring practice is described extensively by the reporter: "While watching the painting of a lantern transparency on a photographic basis, we could not but admire the skill displayed in making a sky possessing uniformity, and which is considered a difficult feat. This was effected in the following way :— The transparency having been placed on the easel, and the palette set with a range of colours from oil tubes, the blue pigment, previously modified with an admixture of varnish, was applied at the top with broad sweeps from left to right in such a manner as to become lighter and lighter as the horizon was approached. But just previous to this stage being reached, other colours of the rose-madder class were blended so as to bring the sky down to the horizon in a warm and pleasant tone. The sky was now ready for having the colours blended together and made to run into one another with such imperceptible grading as to present the appearance of one harmonious and continuous whole rather than a succession of tints. The deft application of the point of the finger effected this, and although it appeared to be accomplished with much ease, yet we could plainly see that it required great care and skill to ensure a uniform result" (Welford and Sturmey 327).

[18] Furthermore, there were the colours in varnish used for mechanised slides and for the tinting of slides that were painted with albumin or aniline colours and sold for 0,60 fr. to 1,25 fr. per tube (E. Mazo, Catalogue 120).

[19] If starting from scratch on a glass plate without a photographic outline, the outlines and contours would be drawn with fine pointed pencils with camel hair, followed by the colouring, which was worked from the background to the foreground. The smaller details of the picture were left until last and were carefully picked out with a fine brush. The finishing was done with a varnish to protect and brighten up the colours (Frutos 5).

[20] An important consideration for today's researchers regarding the final result on the screen is colour degradation that has taken place over time. In addition to storage conditions, slides were projected and thus have probably been exposed repeatedly to strong UV light and heat, a combination that makes discoloration unavoidable.