

# **HISTORY OF A FANTASCOPE – A DEVICE FOR** EDUCATION IN NINETEENTH-CENTURY GIRONA

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In 2014, a new and extraordinary object was added to the collection of the Cinema Museum in Girona - a large phantasmagoria lantern or fantascope. This was in an almost perfect state of conservation, measured 175cm x 67cm x 81cm and was manufactured in the mid-

nineteenth century. It is a very special exhibit as we know of only two similar lanterns: one at the Cinémathèque Française and the other, called the 'Moisse Fantascope', in the Weynants

> collection. The fantascope at the Cinema Museum was discovered in the city of Girona itself, in the storerooms of the History Museum, where it was identified by the

Cinema Museum Director, Jordi Pons.

Through research, the Cinema Museum was able to identify the origins of this fantascope. It had been purchased by the city's secondary school in the mid-nineteenth century. The building which currently houses the History Museum had been the site of this school from its creation in 1841 until 1968 when it was transferred to a new building. Later on, at the current site of the school (now called IES Jaume Vicens Vives), five astronomical glass slides for a magic lantern (with a rackwork mechanism) were discovered, very possibly from the same period as the fantascope.

Recently, as part of the A Million Pictures: Magic Lantern Slide Heritage as Artefacts in the Common European History of Learning project, with the participation of the University of Girona and the Cinema Museum, the history of this object, together with the set of slides, has been studied in greater depth. This article is a summary of the results of the research. The fantascope and three of the five glass slides are currently on display at the permanent exhibition of the Cinema Museum (see also the article on the 'Exhibition at the Cinema Museum in Girona') (continued on page 3)

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## HISTORY OF A FANTASCOPE (continued from page 1)



#### **HISTORY OF THE FANTASCOPE**

The documentation in the *Institut de Batxillerat Jaume Vicens Vives* (1845–1985) collection, which is conserved at the Historical Archive of Girona, has enabled us to establish certain aspects of the history of this object, even though there are few direct references to it. The lantern appears listed among the assets of the school physics department in an inventory dated June 1849: 'Phantasmagoria with six busts and eight pictures'. The previous extant inventory is dated March 1847 and does not mention a phantasmagoria or lantern. We can therefore establish that the fantascope was acquired between these two dates.

At that time, secondary schools published annual reports and various other documents such as the texts of speeches given at the beginning of the academic year. These reports contained different kinds of information and data, including purchases of new material. From a report dated 1849, we know that between 1846 and 1849 three large purchases of scientific instruments were made, all from Paris manufacturers. In early 1846 the first purchase was made from Deleuil. The second and third were made from the Lerebours et Secretan company - one in November 1848 and the other in February 1849 (the items were ordered on those dates and they arrived at the school in March and May 1849). The report lists the different purchases but does not do so in full. Thus we can see that the purchase of physics instruments from Lerebours et Secretan included up to 105 instruments and 83 of these objects are listed. The fantascope does not appear on this partial list. However, on the basis of this report and the inventory already mentioned, we can be virtually certain that the fantascope is from the Lerebours et Secretan company and that it was manufactured around 1849.

We have found a reference to the school's intention of buying a magic lantern in the correspondence between the school and the state government in the same year. A letter dated January 1849 requests authorisation and funds to purchase various instruments, including: 'A magic lantern with two dozen glass slides. 32 [French francs]'. The price indicated makes it clear that it refers to a simple lantern and not to a fantascope, as the latter, according to the catalogues of the period, would have cost between 220 and 600 francs. The fact that the purchase of a lantern was requested leads us to the conclusion that the school had not yet acquired the fantascope, as it performs the same functions (although with many additional features, as we will see in the following section).

Returning to the 1849 report – the one published at the beginning of the 1849/50 academic year and therefore at least nine or ten months later than the letter just mentioned – we can find a possible explanation for why the school purchased a fantascope, a very special lantern, and not a simple one. When the purchases made from the Lerebours et Secretan company are discussed, it states that:

... the devices were directly ordered, without any commission costs; a thirteen per cent discount on the catalogue prices was

## obtained and applied to orders of devices of a more sophisticated kind and for purchases of others not contained in the model catalogue, but of proven usefulness in teaching.<sup>1</sup>

That 13 per cent discount could have been the reason for the purchase of the fantascope. The savings on the order in February 1849 might have led the school to buy a magic lantern 'of a more sophisticated kind' – in other words, the fantascope – rather than the simple one originally intended in January that year.

The quotation refers to a 'model catalogue'. This was the list of instruments that the Spanish Government believed were necessary for departments of physics and natural sciences at secondary schools. In 1845, under the education law known as the 'Pidal Plan', the Spanish Government had set up a network of public high schools throughout Spain. In September 1846 this 'model catalogue' of instruments was published – it does not contain a magic lantern. Going back to the school report, the fantascope would therefore be regarded as one of the objects 'not contained in the model catalogue, but of proven usefulness in teaching'.

We can find later references to the fantascope in the set of reports which has been conserved. It appears listed in two other inventories – one from 1861<sup>2</sup> and one from 1882.<sup>3</sup>.Further, as the reports list new purchases, we know that 'a projection device with its accessories' was purchased in the 1883/84 academic year.<sup>4</sup> We can therefore establish that the fantascope was used at the school at least between 1849 and 1883.

## USES OF THE FANTASCOPE

As we have seen, the evidence suggests that this lantern was manufactured by the Lerebours et Secretan company in Paris. Its catalogues from the period are, therefore, a prime source for identifying the characteristics and possibilities of the fantascope. Approximately within the timeframe of interest, three sales catalogues from this company have been found - the 1846 catalogue,5 a supplement to this catalogue dated 1850<sup>6</sup> and a new catalogue dated 1853.<sup>7</sup> Several types of phantasmagoria and other lanterns appear in these catalogues. We should first say that none of them exactly match the fantascope at the Cinema Museum, but these objects were manufactured to order and so variations in their features are likely. In fact, in the 1846 catalogue there is a note that supports this contention, as it is explains that 'nous venons de construire pour M. Robert-Houdin, l'habile prestidigitateur, une fantasmagorie semblable au nº 105.' [We have just constructed for Mr Robert-Houdin, the skilful conjuror, a phantasmagoria similar to No. 105.]

The conserved fantascope would have resembled the large magic lantern (No. 103) or the two fantascopes or phantasmagorias (Nos 104 and 105) listed in the 1846 catalogue (see illustration):

103. Grande lanterne magique en fer-blanc vernis, produisant l'effet d'une fantasmagorie, ½ boule de 11 centimètres, crémaillère et reflecteur en doublé sur chariot à roulettes

104. Fantasmagorie perfectionnée, en bois, crémaillère, diaphragme variable, chariot à roulettes, demi-boule de 11 centimètres, quinquet à réflecteur en doublé, appareil pour le mégascope, etc. 105. Très-grande fantasmagorie avec mégascope, mais ayant en plus un double appareil optique pour produire les effets de Polyorama et de Dissolving views; un nouveau mécanisme maintient constamment l'image au foyer, et, la diminution de lumière étant proportionnelle à celle de la grandeur de l'image, il en résulte une illusion complète.

[103. Large magic lantern in varnished tinplate, producing the effect of a phantasmagoria, hemisphere of 11 centimetres, rack and double reflector, on trolley with wheels.

104. Improved phantasmagoria, wooden, rack, variable diaphragm, trolley with wheels, hemisphere of 11 centimetres, lamp with double reflector, apparatus for megascope, etc.

105. Very large phantasmagoria with megascope, but having in addition a double optical system to produce Polyorama and

Dissolving views; a new mechanism maintains the image continually in focus, and with the reduction in light being proportional to the size of the image, the result is a perfect illusion.]

These brief descriptions enable us to identify the particular technical aspects of this lantern and, combined with studies by experts including Thomas Weynants<sup>8-10</sup> and Mervyn Heard,<sup>11</sup> to understand the potential of this fantascope. The 'rack' (*crémaillère*) is a mechanism that enabled the operator to vary the position of the lens – in other words, so they could focus the image onto the screen at different distances. The lens of the conserved fantascope is moveable and some construction details appear to indicate that there was such a mechanism at some time. The 'rack' itself, however, has not been found. The description of phantasmagoria no. 105 specifies a mechanism which allowed the operator to automatically vary the focus and diaphragm (the mechanism of wheels, gears and pulleys added to the wheel of the fantascope in the catalogue image). This mechanism has not been found either, if indeed it ever formed part of this fantascope. Nor does the preserved fantascope lens have a



variable diaphragm, used to regulate the brightness of the projected image. According to Weynants<sup>8-10</sup> this is a particularly important feature when the fantascope is used in motion so this can be done without leading to excessive variations in the brightness of the image. The wheels (chariot à roulettes) clearly allowed the operator to move the fantascope to achieve the effect of making the image larger or smaller for the audience. The 11cm *demi-boule* (hemisphere) is the condenser lens that can be seen inside the lantern. This lens, together with the light source, influences the brightness of the projected image. In later catalogues, the phantasmagoria have condenser lenses 13.5cm in diameter and with a suitable objective lens it indicates that they can project adequately bright images up to 3.5 metres away. The largest model contained in the 1853 catalogue has a 27cm condenser lens and uses a new source of oxyhydrogen gaslight - according to the catalogue, it could project images over distances of up to 8 metres. Mysteriously, the Cinema Museum fantascope has a condenser lens 12cm in diameter.

One function we can find in the description as well as in the conserved fantascope, is its use as a megascope - a device for projecting opaque bodies. When used as a megascope, the fantascope light source is used indirectly, not directly as it is when passing through a slide to be projected. The light source illuminates the solid body and the light the object reflects is projected through the lens. The possibility of it being used as a megascope is shown by the presence of three shafts. The central shaft is that of the light source when it is used as a slide-projecting lantern and the two lateral ones are for when it is used as a megascope, with a source of light on each side of the opaque body to be projected. As it is used indirectly, the illuminant must be far more powerful. The lantern's use as a megascope also partly explains the large dimensions of the inside of the box (57cm x 37cm and 48cm high). The reference to the presence of 'busts' in the inventory also supports this use as these would have been small figures made to be projected. When used as a megascope not only is the power of the light source increased, but a different, wider aperture lens is often used that allows more light through but has less precision in focusing. Alfred Molteni explains it thus when he comments on an illustration in his book Instructions pratiques sur l'emploi des appareils de projection [1881 (1878)]:12

Tel qu'il est représenté, l'instrument servait à deux fins, soit pour la projection des objets transparents, soit pour celle des objets opaques. C'est ce qui explique les trois cheminées que l'on remarque au-dessus de la boîte, ainsi que le porte-lentilles de rechange, qui est figuré entre les pieds du chariot.

[As shown, the instrument served two purposes, either for the projection of transparent objects or for that of opaque objects. This explains the three chimneys above the box, as well as the replacement lens holder, which is shown between the feet of the trolley.]

The Cinema Museum fantascope was found with just one lens but, if we look at how it is constructed, we can suppose that the piece of wood at the front, where the lens is located, was interchangeable. However, in other lanterns (such as the Moisse Fantascope) changing the lens appears simpler than in this case.

The function which appears impossible for the Cinema Museum fantascope is projecting 'Polyorama and Dissolving views'. In order to perform these effects, there must be two lenses, side by side, capable of projecting two different slides, and it is clear that the front of this fantascope is not wide enough to hold two lenses.

The Lerebours et Secretan catalogues also contain lantern slides for sale. All three catalogues include a set of astronomical slides like the ones found at the school. The conserved slides are 17.6cm x 9.8cm and have handwritten lettering in Spanish which specifies the subject: 'Comet', 'Tides', 'Rotation of the Earth', 'Solar eclipse and passing of a star' and 'Lunar eclipse'. In the 1846 catalogue we found descriptions that match four of the slides and one in the 1853 catalogue that matches the fifth:

111. 2º COMÈTE décrivant son ellipse

114. 5° EXPLICATION DES MARÉES par l'action du soleil et de la lune

117. 8° LE JOUR ET LA NUIT produits par la rotation de la terre sur son axe

118. 9° ÉCLIPSE DE SOLEIL, partielle et annulaire, avec le passage de Vénus sur le soleil (1846)

196. 10° ÉCLIPSE DE LUNE partielle et totale (1853)

[111. No. 2 COMET describing an ellipse

114. No. 5 EXPLANATION OF TIDES by the action of the sun and moon

117. No. 8 DAY AND NIGHT produced by the rotation of the earth on its axis

118. No. 9 SOLAR ECLIPSE, partial and annular, with the transit of Venus over the sun (1846)

196. No. 10 LUNAR ECLIPSE partial and total (1853)]

These slides have a very specific educational function – to show astronomical phenomena with movement. The above-mentioned book by Alfred Molteni<sup>12</sup> includes an appendix with detailed readers' notes for a set of slides very similar to these.

The Lerebours et Secretan catalogues also offer for sale objects 'pour le mégascope' [for the megascope]:

124. Bustes et médaillons en plâtre

125. Tête de mort ailée, ayant la tête, les yeux, la mâchoire et les ailes mobile

126. Squelette sortant de son tombeau

127. ld. creusant sa fosse

128. Figures diverses en carton découpé

[124. Plaster busts and medallions

125. Winged skull with head, eyes, jaw and moving wings

- 126. Skeleton emerging from its tomb
- 127. Idem. Digging its grave
- 128. Various cut-out cardboard figures]

The school in Girona, as mentioned at the beginning, acquired the fantascope with six plaster busts. But this list emphasises a very interesting and evident aspect of this story, namely how the fantascope belonged to the world of audiovisual spectacle and entertainment but, at the same time, how it could also be acquired by a teaching institution such as the Girona secondary school.

#### PHANTASMAGORIA AND EDUCATION

The fantascope was acquired by the Girona secondary school for educational purposes. The astronomical slides offer an example of how it could have been used within an educational context. All are slides with movement and, as such, provide simulations or examples of astronomical phenomena – far more effective than a printed illustration. This would certainly have been one of its functions. However, we have not come across any references to other similar sets of educational slides that could be purchased during the nineteenth century, either at the current school or in the conserved reports. Its function as a megascope may have constituted a more common use, given that not only the purchased busts but also prints and other objects owned by the school could have been placed in it. REFERENCES

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Another educational use of the fantascope could have been not as a projector but as an object of study in itself. The fantascope was in the physics department and, more specifically, the optics section. The magic lantern, with the phantasmagoria as a sub-topic, may have been one of the study topics in the physics lessons. The fantascope would thus have been studied as a technology, one which, outside the school, was used for audiovisual spectacles that the pupils might have seen at one time or another. The physics treatises of the time, such as Ganot's,13 explain the rudiments of projection with a magic lantern, and the phantasmagoria is sometimes mentioned separately in a detailed sub-section. Thus, *Cours de physique purement expérimentale*,<sup>13</sup> explains the phantasmagoria, pointing out that the fundamental difference between it and a lantern is the mobility of the projection device.

The case of the Girona fantascope is quite special because of the spectacular nature of the lantern. The combination of its potential as a tool (either for slides or as a megascope) and as a study topic in itself is bound to have justified its purchase. When we continued our research, another case of a Spanish school with a phantasmagoria lantern was discovered. The Pamplona secondary school purchased a 'sophisticated phantasmagoria' in 1848,<sup>14</sup> with a 'collection of motion pictures for the explanation of astronomical geography.<sup>15</sup> However, although not unique, most schools do not seem to have had one – but almost all list a 'magic lantern'.

One final related point of interest to add to the history of the Cinema Museum fantascope is that there were a surprisingly large number of objects related to audiovisual culture to be found in the physics department of the Girona secondary school in the midnineteenth century. Devices such as the fantascope found themselves at the intersection between science, education, image creation and entertainment and formed part of the popular audiovisual culture of the time. Reading the school's inventories and documentation from that period, we can observe that the following devices were bought: a solar microscope, an Amici camera lucida, a kaleidoscope, a phenakistoscope (Joseph Plateau's, according to the inventory), a complete laboratory for daguerreotypes, a Newton disc, anamorphic lenses, a stereoscope and what could have been a projection praxinoscope, as specified in the 1882 school report.

In short, by uncovering the history of this fantascope we have been able to identify a specific example of the use of this device as an educational tool, beyond its better-known application in the world of phantasmagoria and magic lantern spectacle.

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**NOTE:** For further information on the fantascope and the astronomical glass slides see: Jordi Pons and Daniel Pitarch, 'History of a fantascope: a device for education in nineteenth-century Girona', Early Popular Visual Culture, Vol. 15, issue 1 (February 2017) pp. 83–9. Routledge.

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