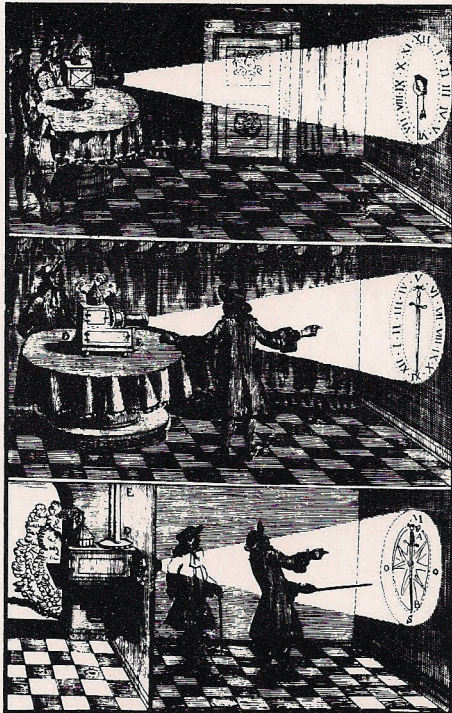


# THE FACE OF A CLOCK

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Anyone who has pressed his nose against the glass of the magic lantern window in the Science Museum of London has seen Johan Zahn's book *'Oculus Artificialis Teledioptricus...'* (1685). One of the wood-engravings in the edition of 1702 shows the projection of the face of a clock. See Figure 1. When looking at the picture a question crosses my mind: *'What are the two gentlemen discussing?'* We look back now about 300 years to when Johan pointed to a curious use of the magic lantern.



**Figure 1:** The illustration from J. Zahn's *'Oculus Artificialis Teledioptricus...'* etc. Gives some practical applications of the magic lantern. The upper and center drawings have something to do with time keeping. The lower sketch shows the projection of a compass-card and has something to do with the direction of the wind (note the vertical spindle up the lantern).

As shown in Figure 1, there was apparently some difficulty in simultaneously projecting the hands and the numbers of the clock face. The upper illustration shows the projection of a clock face around an illuminated weight-driven clock mounted on the wall. In the lantern is a fixed lantern slide of glass, on which the numbers have been painted. It is not clearly visible on the drawing that the hands of the clock are pointing to the projected numbers.

The middle drawing suggests a next step in the evolution of solving the problem. On the wall the men have positioned a sword as a fixed hour-hand and in the lantern they rotated the lantern slide showing the picture of the clock face. I suppose there is inside or behind the lamphouse of the lantern a clockwork which drives the rotatable lantern slide. The lower drawing has something to do with a compass-card projection.

After the Renaissance there was a growing interest in time-keeping during the night. This interest stimulated a practical way of thinking about the magic lantern and can be seen as a contrast to the practices of theatre and domestic performances. A few other pictures found in old books give the same impression and these early birds can be recognised by the projection of the face of a clock or of a sword surrounded by signs.

Evidently there were already in the old days wonderful acoustical devices. Some of them make a pleasant sound every quarter or smaller

part of an hour. Therefore I was fascinated by the observation that some people in those old days apparently preferred a silent image in their sleeping rooms to a ticking and chiming pendule. These ticking devices are very attractive. However, I restrict this short note to the visible image made by an optical device.

## THE MAGIC LANTERN AS A CLOCK

The next example I found in my available literature was dated 1724. In *'L'architecture de Schubler'*, there is a description of a very large public clock, which is composed of a magic lantern and a large clock-work. The magic lantern projected the enlarged clock face onto a wall in the street. Although the nights were then very dark this clock was probably a useless luxury. There must be more documentation on this kind of street furniture.

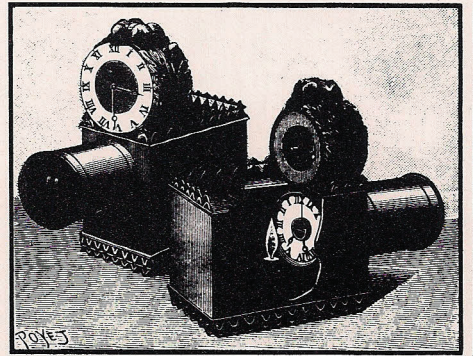
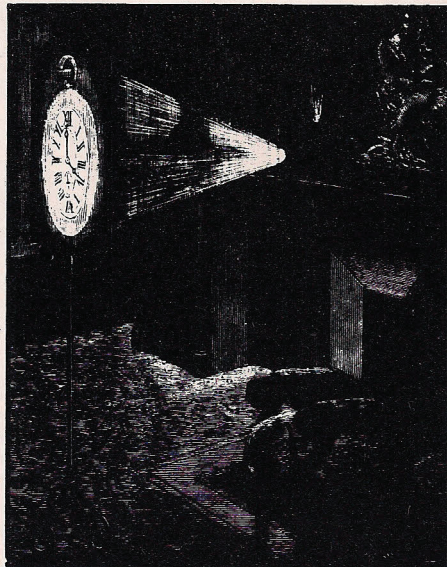
The marriage of clockwork with the magic lantern has born some curious children. In Germany they are called *'Schlafzimmer Projektionsuhr'* and in France *'Veilleuse-Horloge'*. Although I found some information about them a detailed description is seldom given.

In general the transparencies used in the clock-lanterns have a fixed clock face with black painted numbers on the glass and one or more rotatables with painted hands. This is according to the patent of Mr. Rehait (Museum des Arts et Metiers at Paris) of an enlarger for a watch face.

Again we must step forward about 100 years to discover a drawing of a magic lantern-clock. From my grandfather I owe my love for *'La nature'*, a French magazine (edited by Gaston Tissandier) between 1873 and 1900. In the volumes of 1884 and 1895 I discovered a few interesting details about these night-time projectors for home use. Figure 2 shows such a device made by Mr. E. Joyeux. It is clear that he uses the principle of the opaque lantern as he projects the face of a pocket watch on a small transparent screen.

The designer has solved the problem of the required clarity with a small oil lamp, which produces enough light to project an enlarged image of the watch on the screen during the night. Further, he states that the user can keep his cup of chocolate warm with the heat of the lamp! The apparatus consist of a lamphouse and a lens in a sliding tube. One side of the lamphouse is partly removable, so that a pocket watch can be fixed on the innerside and positioned in front of the lens. The wick holder is fitted with a reflector

**Figure 2:** Woodcarving of the installation of a small opaque lantern with a pocket watch for time keeping during the night.



**Figure 3:** Construction details of a clock lantern with a transparent and fixed hour-plate.

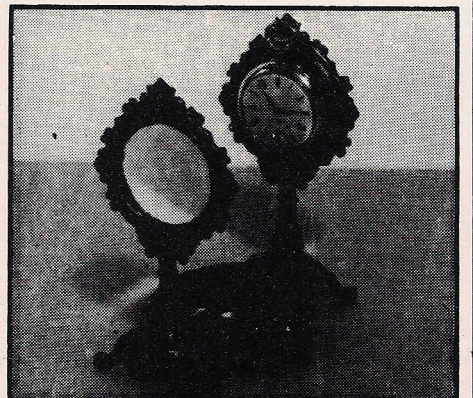
and is placed beside the optical axis. To optimise the image on the screen it is possible to adjust the position of the lamp.

One can place the apparatus on a table or on the mantel-piece. The distance from lens to screen depends on the desired enlargement, but the weak light set its limits.

It is believed that with an enlargement of five times, the diameter of the projected clock face is acceptable and this corresponds in this instrument with a distance to the screen of about three feet. Another specification of the lantern sets the oil consumption at about two ounces for ten hours.

## OTHER CONSTRUCTIONS

The advantage of the transparent slide is the better clarity of the image. Figure 3 shows a pendule lantern with a lamphouse made of brass. According to this principle a small oil lamp with a reflector was used as the light source which illuminated directly the glass on which the numbers for the hours had been painted. In the centre of this fixed plate of glass is mounted a small mechanical device that moves the hour and minute pointers, made of metal, close to the glass. By means of a fine thread the mechanical contraption is driven by the clock-work mounted above the lamphouse. Probably the contraption contains a gearbox with a ratio of 12 : 1. Further the spring-driven clock has its own dial, so it can be used and adjusted during the day.



**Figure 4:** A cast-iron frame with a watch holder and lens fitting.

An open opaque lantern model of this kind of night clock was found in a flea market in Amsterdam. Figure 4 shows the construction. It is a watch holder fixed on one side of a lamp-carrier which carries also a lens in a stand on the front end. The construction is made of cast-iron in Baroque style. Sadly the tin of the lamp was mostly destroyed by acid oil, but the remnants indicate a rude adjustment for the wick and a blended reflector. The reflector is positioned below the optical axis.

It was made by Zimmermann in Hanau around 1880 and I believe the image must be projected on the ceiling of the sleeping room by means of a separate inclined mirror. I have tried it in this way with an electric light source that produces a pencil beam and I obtained a very faint image, better described as a disappointing blur.

I do not want to give the reader the impression that I have fully researched this subject. I have tried to give an introduction to the topic and have only referred to the books in my library.