

Movie Machine

More Details

The long road to modern cinema technology – three important inventions

1. How to project an image onto a wall? The magic lantern (Fig. 1) is a box containing a light source. This light passes through a lens on the front of the box to the outside. The images, initially painted on glass, are inserted into the frame in front of the lens and projected onto a screen with the light that comes out. What was initially a funfair attraction soon developed into the slide projector of the time.
2. How can you capture an image of the real environment? The camera obscura (Fig. 2) is a container into which light can enter through a small hole. On the opposite side an upside down image is created. This projection can be viewed or traced. Artists used this possibility and there were even walk-in versions. The box camera works on this principle.
3. How to fix an image of the real environment? The development of the dry plate with a silver bromide gelatin coating brought about the breakthrough of photography, as it no longer had to be processed immediately after exposure, like the wet plates which had previously been used.



Fig. 1: magic lantern.

Fig. 2: camera obscura.

Why the cinema machine?

Isn't that a zoetrope? Yes, but what may seem to be just a nice toy was a milestone in the presentation of moving pictures, as the scientific name suggests. With "machine" (Greek *mechané* = device, but also trick) this should be emphasised. The fascination at that time was so great that devices of this kind were even made available to the public in coin-operated machines. When it later became possible, for example, to break down the jumping of a horse into individual pictures with 16 cameras set up in parallel, the military also became interested in movement studies of this kind. But only a weakness of our eyes enabled today's cinematic experience!

The reason why successively shown single images give the impression of a continuous movement can be explained simply by a forerunner of the cinema machine, the thauma-trope (Greek *thauma* = wonder and *tropos* = turn).

Two complementary pictures are painted on the front and back of a disc (e.g. a bird and a cage). If you now turn the disc fast enough by showing the front and back alternately, the impression of the bird sitting in the cage is created. This means that the eye can be deceived. If you now arrange single pictures of a motion sequence on a tape for the cinema machine and show the eye the single pictures one after the other (with at least 16 pictures per second), an impression of movement is created. This is based on the stroboscopic effect (Greek *strobos* = to turn and *scopein* = to look at).

The afterimage effect of the eye helps to merge the images and thus to create a seemingly continuous sequence. It is not our brain but our eye that is too slow to recognise individual images, because the light stimulus of each individual image continues to have an effect for a short time. Edison succeeded in making great progress with the construction of a camera with perforated film tape (cinematograph) and a viewing device (kineto-scope). The Lumière brothers then achieved the decisive breakthrough with their cine-matograph, because it enabled films to be shown on a large screen.

