# Hands On Learning
## *with Reading Museum Service*

## PHENAKISTOSCOPE D44/A



A phenakistoscope consists of two discs mounted on a handle. The first disc has slots around the edge, and the second contains drawings of successive action, drawn around the disc. The viewer holds the contraption towards a mirror. The handle is held with one hand and the disc spun with the other. Looking through one of the slots the images appear in motion.

The phenakistoscope was invented in 1832, by the Belgian physicist Joseph Plateau. It was also invented independently in the same year by Simon von Stampfer of Vienna, Austria, who called his invention a stroboscope. Plateau's inspiration had come primarily from the work of Michael Faraday (1791-1867) and Peter Mark Roget (1779-1869). Faraday had invented a device he called Michael Faraday's Wheel, that consisted of two discs that spun in opposite directions from each other. From this, Plateau took another step, adapting Faraday's wheel into the toy he later named the phenakistoscope.

The device is quite tricky to operate and it takes a while to be able to see the moving images. Remember to spin the disc using the raised section on the back, rather than pushing it around at the rim! After going to market, the phenakistoscope received other names, including Phantasmascope and Fantoscope. It was quite successful for two years until William George Horner invented the zoetrope, which offered two improvements on the phenakistoscope. First, the zoetrope did not require a viewing mirror. The second and most influential improvement was that more than one person could view the moving pictures at the same time.

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Ingenious devices such as the phenakistoscope were very popular in the nineteenth century. Other inventions of this kind were:



•**The thaumatrope** (right, above) - a circular disc having on its opposite faces figures of two different objects, such as a bird and a cage, which, when the disc is whirled rapidly round appear to the eye combined in a single picture, as if the bird is in its cage. Invented by Dr J. A. Paris of Penzance in 1827.

•**The kaleidoscope** - a tube, with mirrors arranged inside, so that scraps of coloured glass contained in the end opposite the viewers eye are arranged into constantly changing symmetrical patterns as the tube is twisted. Patented by Sir David Brewster in 1817.



•**The zoetrope** (right, below) - a cylinder with slits cut vertically in the sides, rather than a disc on a handle. Invented by W.G. Horner (1786-1837) of Bristol in 1834. Horner's own name for his invention was The Daedalum (or the Wheel of the Devil).

Although toys, most of these devices were the work of scientists with a serious interest in optics. Sir David Brewster, for example, invented the lenticular stereoscope, the binocular camera, the polyzonal lens, the polarimeter, and the lighthouse illuminator although today he is mostly remembered because of the kaleidoscope! Such devices were popular with adults as well as children because they mixed fun with scientific curiosity. These and other devices led to the invention of the film projector and the cinema. Without them Hollywood might have remained an insignificant small town on the west coast of America.

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How does the phenakistoscope work? In 1825 Dr P.M. Roget (1779-1869), the creator of the famous *Thesaurus of English Words and Phrases*, published a paper in the *Philosophical Transactions of the Royal Society* in which he suggested the idea of 'persistence of vision'. He suggested that the human eye and brain retain a visual impression for about 1/30th of a second. The image in the zoetrope appears to move because 'persistence of vision' blurs together individual images into a smooth sequence. This idea has been used to explain our failure to notice that a cinema screen is dark about half the time, and that a television image is just one bright, fast, little dot sweeping the screen. Motion pictures show one new frame every 1/24th of a second. Each frame is shown three times during this period. The eye retains the image of each frame long enough to give us the illusion of smooth motion.

However, in recent years this theory has been questioned. The experimental work is complex, but in simple terms the alternative suggestion is that the eye is unable to distinguish closely spaced stimuli.

