Hands On Learning
with Reading Museum Service

ZOETROPE D43/B



A zoetrope is a device that produces an illusion of action from a rapid succession of static pictures. It consists of a cylinder with slits cut vertically in the sides. Beneath the slits, on the inner surface of the cylinder, is a band which has a set of sequenced drawings. As the cylinder spins, the user looks through the slits and sees a rapid succession of images producing the illusion of motion.

The zoetrope was invented by William George Horner (1786-1837) of Bristol in 1834. Horner was the son of a Methodist minister and was educated at Kingswood School, Bristol. In 1800 at the age of 14 he became an assistant master at Kingswood School and headmaster four years later. He left Bristol and founded his own school in 1809. He is remembered today for 'Horner's Method' a technique for solving algebraic equations and for inventing the Zoetrope. Horner's own name for his invention was The Daedalum (or the Wheel of the Devil).

The Daedalum was introduced to the United State of America by William E. Lincoln in 1867, who changed the name to the Wheel of Life, or Zoetrope, from the Greek *zoe*, life + *tropos*, turn.

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

•**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 phenakistoscope** (pictured right, above) - a revolving card with slits cut in it, between which there were figures drawn in different attitudes. The card is spun with the images facing a mirror. The viewer looked through the slits at the mirror and the images appeared in actual motion, such as an animal leaping. Invented by the Belgian scientist J.A.F. Plateau in the early 1830s.

•**The thaumatrope** (pictured right, below) - 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.



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 zoetrope 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.



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ZOETROPE.

The **ZOETROPE, or "Wheel of Life,"** is an instructive Scientific Toy, illustrating in an attractive manner the persistence of an image on the retina of the eye; it consists of a card-board cylinder, about 12 inches diameter, and 8 inches deep, with 13 equidistant narrow openings, each about 3 inches long, arranged near the top as shown in the engraving. The lower end rests on an iron shaft, rising from a substantial wood base; on strips of paper, about 3¼ inches wide, 36 inches long, are printed figures of men, animals, etc., in different positions, which are placed in the cylinder. By revolving the cylinder by the hand, and looking through the openings, the images passing rapidly before the eye are blended, so as to give the figures the motions of life in the most natural manner. As many persons as can stand around the Zoetrope can see the movements at the same time.

PRICE OF THE ZOETROPE, $2.50.

Including following series of 12 amusing pictures: Base-ball Player, Chewing Gum, Dolphin Swimming, Donnybrook Fair, Gymnast, Hash Machine, Jig Dancer, Johnny Jumper, Keep the Ball Rolling, Kick her up, Old Dog Tray, Raining Pitchforks.