









Optical devices on view in the front office of
Rare Books and Special Collections, Firestone Library
2012

1	 A vintage orange tin projector with a lens on the left side and two glass fixtures on top. The tin has a label that reads "RADIO JUNIOR".	<p>Radio Junior Post Card Projector. North Bennington, Vermont: H. C. White Co., ca. 1920. Printed tin with two electric fixtures.</p> <p>A modern variation of a magic lantern projector designed for viewing both traditional glass lantern slides and opaque objects, such as postcards. A similar machine, marketed to adults, was called the Electric Radiopticon or Heliopticon.</p>
2	 A black metal stand with a central spindle holding several circular printed paper discs. The discs feature various colorful illustrations, including a clock face and a floral pattern.	<p>Phenakistoscope (contemporary model of a French device around 1832). Printed paper discs mounted on wood and brass base.</p> <p>The term “Phenakistoscope” comes from Greek roots meaning “deceiving viewer.” In 1832, Belgian physicist Joseph Plateau and his sons introduced one model of the phenakistoscope or “spindle viewer,” while at the same time in Vienna, Simon von Stampfer created a similar device he called a Stroboscope. Both rely on the same principle: the human eye blurring rapidly moving images into an illusion of motion.</p>

3		<p>The Praestania (Magic lantern slide projector). Bradford, England: Riley Brothers, 1885-1900. One lens, iron, brass, and glass.</p> <p>This projector was designed for teaching and lecturing to a large audience with photographic glass slides, also known as lantern slides.</p>
4		<p>Perken Optimus Magic Lantern, Perken, Son, & Rayment, 1875. Mahogany body with brass bound lens, rack and pinion focus.</p> <p>Around 1660, the Dutch scientist Christiaan Huygens developed an early form of the magic lantern. Over the years, various sources of light have been used in similar devices, from a simple candle to modern electric systems. Although this projector has a chimney and was originally lit by limelight, it was later wired for electricity.</p>
5		<p>Pathé-Baby projector, for use with 9.5 mm films. Paris: Société Pathé, 1920s.</p> <p>By the early twentieth-century, the Société Pathé Frères had built the largest film equipment and production company in the world. To increase their 1922 Christmas sales, they released the first projector meant for home use: the Pathé Baby. Kodak quickly released its own home movie equipment and film, and by 1935 Pathé was forced into bankruptcy. The 9.5 mm Pathé Baby films come in small cassettes holding approximately 30 feet of film, which plays for about 60 seconds.</p>

6		<p>Red Raven magic mirror movies. Morgan Development Laboratories, Inc., 1956.</p>
7		<p>Camera Obscura (portable), late 18th or early 19th century. Walnut box with 5 x 7 inch viewing ground glass, mirror, lens with sliding focus. The early camera obscura consisted of a darkened room with light admitted through a single hole. The beam cast an inverted image on the opposite wall, showing the view outside the room. In the seventeenth century, the German astronomer Johannes Kepler (1571-1630) coined the term Camera Obscura (from the Latin meaning “dark chamber”) and built a portable tent camera for surveying in Upper Austria. By the eighteenth century, small portable camera obscuras were widespread, usually an angled mirror inside a wooden box allowed an artist to view and trace an image right-side-up on the ground glass.</p>
8		<p>Viewing box or <i>Boite d'optique</i>, 1700s. This viewing device for hold-to-light engravings. , also known as a Peepshow or Raree Show, consists of a box with at least one viewing hole through which a hand-colored engraving can be seen. A flap at the top, when lifted, will light the image from the front to show a daytime scene. When the flap is closed, light enters from behind the print through holes pierced in the paper and creates a nighttime scene. Some Peepshow boxes had a series of strings on the side attached to the pictures. By pulling a string, the showman could raise or lower an image into a 'holding area' above or below the viewing area. Optical viewing device. European, 1700s. Wood, lens, and engraved print mounted in the frame.</p>

9



Children's Magic Lantern set.

10



Children's magic lantern with six slides in a wooden box. French, ca. 1880. Painted tin, lens.

11



Polyorama panoptique. British, ca. 1850

12



Thaumatrope or Trompe-l'oeil ou les plaisirs de Jocko. Paris, ca. 1837. Box and 24 discs.

The invention of the thaumatrope, or wheel of wonder, is often credited to British astronomer Sir John Herschel but it was London physicist Dr. John A. Paris who popularized it. These are simply small paper discs with related images on either side. When you twirl them on the strings, the images merge to form one picture. The name comes from the Greek: thauma = miracle; tropos = turn.

13



Praxinoscope, Reynaud, Paris Anon, ca. 1877. Metal cylinder, wood base, 12 mirrors, printed paper strip.

An improvement on the Zoetrope, the Praxinoscope employs the same elements: a moving drum cut with viewing slots and a strip of paper with a sequence of images. To these, the French scientist Charles-Émile Reynaud added an inner circle of mirrors, one for each image. The reflected images proved brighter and clearer than ones viewed directly.

14



English zoetrope, 1830s. Printed paper strip, tin cylinder, wood base. William Horner is credited with the 1834 invention of the Zoetrope, based on the phenakistoscope and originally called a Daedaleum or Wheel of the Devil. Horner drew a sequence pictures on a strip of paper and placed it inside a circular drum. Slots were cut at equal distances around the outer surface of the drum, just above the paper strip. When the drum was spun, the images inside, viewed through the slots, seemed to move. Unlike the Phenakistoscope, the Daedaleum could be enjoyed by more than one person at the same time.

15



A Trip to Town. London: William Sams, 1823. Myriopticon or paper theater or hand colored panoramic etching.

Princeton owns two copies of this printed panorama, this one in two hand-held cylinders and the other (below) in a box specially-designed by the binders Sangorski & Sutcliff. A set of prints at the Library of Congress that matches our continuous strip is titled "The Misadventures of a Pair of Newlyweds Who Leave the Country for the Superior Pleasures and Society of London" and is attributed to Theodore Lane. Others researchers have attributed it to Thomas Rowlandson, although neither attribution can be verified.

16



Peep egg. London, ca. 1850. Alabaster, monocular lens, and miniature engravings.

When a viewer looks through the lens at the top of this popular Victorian toy and slowly turns the handles on either side, three different pictures are seen: a hand-colored engraving of Greenwich Hospital, an engraving of the Thames with the entrance to the Thames Tunnel, and a panel with a selection of crystals and dried foliage. The body of the egg-shaped viewer is made of translucent alabaster stone to allow light to penetrate and illuminate the pictures. These viewers were often sold as souvenirs or mementos of popular events or famous sites and led to the twentieth-century development of the View-Master. Unlike moving image viewers, such as the phenakistoscope or the zoetrope, this personal viewer allows one person to view one still image through a monocular lens. More complex peep shows or *boite d'optique* were equipped with many openings and/or moving parts to simulate daytime and nighttime. These viewing eggs were often made as souvenirs for a special event, festival, or exposition. The peep egg is made of alabaster, so that light passes through the body of the device and no other source of illumination is required. The body is fitted with twin alabaster handles rotating a spindle so that two or three prints can be mounted inside the body of the egg. Each person turns the handle at his/her own speed to see each of the images. Princeton's egg is from London and offers a hand-colored engraving of Greenwich Hospital, another of the Thames river at the entrance to the Tunnel, and a third panel in-between with a small bouquet of dried foliage and crystals.

17		<p>Stereoscopes with stereoscopic slides. Several different types of hand-held stereoscopes are included in this display. One is based on the American model developed by Oliver Wendell Holmes (18 -18) and one designed by David Brewster (1781-1868) in England. Both the Cotsen Library and the Graphic Arts Collection hold large numbers of stereocards.</p>
18		<p>Zograscope. European, early 1800s. Double convex lens, mirror, and wood base. The Zograscope or Optical Diagonal Machine is device used for viewing prints that were specially designed with exaggerated perspective to give the illusion of three dimensions. The prints, or vues d'optique, were often pierced so that, when lit from behind, they gave the added illusion of a nighttime scene. These prints were originally exhibited by traveling showmen, who charged a small fee for each view. Later, the professional and upper classes collected their own prints for use with tabletop devices, such as this model.</p>
19		<p>Reflex camera, 1905. Made by the Reflex Camera Company, Newark, New Jersey. This camera uses an adjustable lens by Voigtländer & Sohn, Braunschweig, Germany. On December 4, 1942, <i>The New York Times</i> posted an obituary for Louis Borsum (1856-1942), who “developed the Reflex Camera and Metal Polish.” Originally from Germany, Borsum was a pioneer in the development of photography equipment, filing his first patent in 1891. The model shown here was a later variation on the Reflex camera, first patented in 1895.</p>

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21



Transformation Game, mid-19th century, eight paper-covered wood blocks with lithographed designs of the heads and torsos and the legs of various comic

Myriorama [Greek: myrio = 10,000 times, high number; horama = that which is seen] Vertical montage of a segmented panorama – literally the 'many thousands view'. Myriorama These picture sequences, which could be combined at will in a variety of ways, were invented by the Frenchman Jean-Pierre Brés around 1820. A landscape panorama would be cut into 16, 24 or 36 equal vertical segments. Since the horizon line was always at the same height where the segments met, the individual sections could be interchanged in endless variations. The motifs chosen were generally of topographies that were not readily identifiable – mountains, rivers, coastal landscapes. In order to lend unity to the whole, in the foreground of the picture there would be a path or river, or suchlike. It was essential that in this lower zone of the view there should be no breaks or sudden shifts in perspective which would destroy the impression of continuity. Only in the middle ground was there a rapid move from one feature to the next: ruins and rocks, a fir tree and a waterfall, and so on – pictorial elements that could generate ever more new landscapes.

22



Toy magic lantern, Bausch & Lomb Optical, , GA 2005.01034 Magic lantern [Red tin], Unidentified Artist, , GA 2005.01281 The lantern projects a corrected version of this image onto a screen or wall. The invention of the magic lantern is credited to the Dutch physicist Christiaan Huygens (1629–95). Although he made no practical use of his invention, he was already drawing a moving lantern image of a dance of death for the magic lantern, as early as 1659. In 1665 the Danish mathematician Thomas Walgenstein (1622–1701) presented a magic lantern as a great novelty at an exhibition in Lyon. In Amsterdam in 1671, Athanasius Kircher (1602–80) published the second edition of his *Ars magna Lucis et Umbrae* (The Great Art of Light and Shadow) with the first illustrations of a magic lantern projecting images. At the beginning of the eighteenth century traction, rotation and leverage mechanisms for glass pictures were already being used in order to project moving images.

23



Folding box camera [with Ross London lens], Unidentified Artist, 1855/05/05 (patented), GA 2005.01285

24




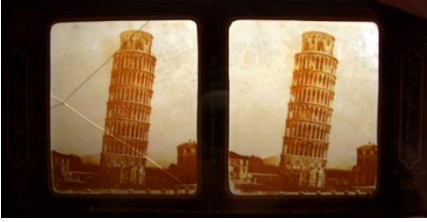


A trip to town [Panorama with hand-held drums], Unidentified Artist, 1823, GA 2005.01847 A trip to Town [Panorama with viewing case], Unidentified Artist, 1823, GA 2005.01039 Trip to Town (London: William Sams, 1822). Handcolored etching.

British satirical, narrative panorama consisting of twelve scenes rather than one continuous image. The coloured etching pasted to the drum consists of the title, and a view of a showman with two realistic puppets of a man and a woman who are made to dance. The showman attracts attention by blowing on a pipe and beating a tambourine. A second man blows on a bugle. A crowd watch the show with rapt attention. Above the image are four lines of verse: The Puppets thus unconscious move/ In shew of happiness and love,/ They raise a smile, a laugh, and roar,/ And then their giddy dance is o'er. Below is the imprint: Published by W. Sams, Bookseller to his R.H. the Duke of York, No. 1 St James's St., London, 1823. The stay is made of board; a silk tab attached to it also facilitates the panorama's extraction. The story on the panorama itself advances from r. to l., each scene being introduced by lines of verse on draped cloth. On the first we learn that Mister O'Squat, quite full of Life/ Sought Widow Shanks to be his wife. Both seek matrimonial treat without any concern for money. In the later scenes O'Squat experiences a humiliating fall. The couple spurn the 'rusticated state', and head off on an irresponsible frolic for London.

25



Lanterna Magica, E.P., , GA 2005.01282

26		<p>Three stereo transparency viewers. The first American viewer came with glass slides showing scenes from World War I, ca. 1919. The second is a French viewer sold at the Exposition Coloniale, 1931. The third viewer came with scenes from a mountaineer's climb of Mont Blanc, ca. 1900.</p>
27		<p>, , , , , 27,</p>
28		<p>Praxinoscope Theatre, Benevolo (Lyon), n.d. [ca. 1877], GA 2005.01020 The Praxinoscope was immensely popular as a family entertainment. This variation came in a box that could be assembled into a miniature theater, similar to puppet theaters at the time. Praxinoscope Toy Theater. Lyon: Benevolo, 1800s. Cardboard, metal, mirrors, and wood.</p>
29		<p>Binoculars or early opera glasses and case</p>
<p>Not on view</p>		



Carlo Ponti (1823-1893). Megalethoscope. Ca. 1870. Gift of William Mackenzie

In the 1860s, Swiss-born Carlo Ponti, optician to King Victor Emanuel II of Italy, created a device called an Alethoscope for the viewing of both prints and photographic hold-to-light slides. Large or mega versions were also designed with elaborate carving. These we call Megalethoscopes. As with other viewing boxes or peep shows, when light is directed onto the front of the image a daytime view is achieved. When the box is closed and light comes from behind the image, a nighttime scene view can be seen.



French tabletop stereo viewer, ca. 1890.

This *visionneuse* (viewer) was discovered by Nicole Canet and included in her 2009 exhibition “Maison Closes” (Brothels) at the Galerie au Bonheur du Jour, Paris. The stereo viewer originally sat in the waiting room of a Paris brothel, where patrons could peruse a series of paper stereo photographs depicting the “pensionnaires travaillant dans la maison” (boarders working in the house). Princeton's box holds more than two dozen cards on a wire frame linked together in a continuous loop.



Chuck Close. Self-Portrait (anamorphic). New York: Two Palms, 2007. Edition: 4/20. Engraving with embossment on black Twinrocker handmade paper, mounted on wooden box/platform, with polished stainless steel cylinder.

The American artist Chuck Close divided a photograph into sections and painted each section abstractly, although when viewed at a distance the image reads as a realistic portrait. The image was then distorted into a semi-circular pattern, which was engraved by laser onto an acrylic plate. Once inked, the plate was pressed into hand-made paper using an overhead hydraulic press that can exert up to 750 tons of vertical pressure evenly on the paper and plate. The final image can only be seen realistically through a polished cylinder placed in the center of the design.



Martin Engelbrecht (1684-1756), Perspective prints. 1700s.

Both the Cotsen Library and the Graphic Arts Collection hold large numbers of hand-colored perspective engravings, many from the Augsburg publishing house Martin Engelbrecht. These can be viewed with a zograscope or in view boxes. Scene are drawn to emphasize the depth and dimension of the scene, which is further enhanced when viewed through a convex lens. His Augsburg workshop produced more than 300 views, usually with captions in four languages.



Hold-to-light prints and slides.

Both the Cotsen Library and the Graphic Arts Collection hold many variations on the hold-to-light prints. These could be used in viewing boxes, alethoscopes, or simply held up to a light source. Colored tissue paper and/or watercolors were often used on the verso to heighten the scene.



William Hyde Wollaston (1766-1828), Camera lucida, patented 1807. Primarily for artists, the camera lucida was used during the day for sketching or tracing from nature. The instrument consists of an extendible metal pole holding a 45-degree prism and sighting lens, through which the artist can see his subject below on his paper. Scientists who were not particularly good draftsmen also used the device to trace botanical specimens.



Otto Schleiffelder, Claude glass, 1900s. Leather-bound wood case with convex black glass and black velvet. In this case a reflection of the view is seen in the black glass which mutes the colors.



English viewing box with magazine holding 44 perspective prints. 1700s. Oak box with moveable lens for focusing, 44 hand-colored engravings.

A variation on the horizontal viewing box, this one holds all its prints in a bottom compartment. One viewer at a time looks into the lens at the top while someone else moves the prints in and out of view. The engravings were all printed and sold by the London dealer Cluer Dicey (1714-1775) at the family's printing office in Bow Church-yard.