



THE PHANTASMOSCOPE, OR MAGIC WHEEL.

In an illustrated article upon the "Horse's Motion Scientifically Considered," which appeared in the *Scientific American* Supplement, No. 158, January 11, 1879, the use of the zoetrope was suggested for showing the appearance of a horse in motion.

A zoetrope, although not complicated requires considerable care and mathematical precision in its construction; but the phantasmoscope, or magic wheel, is comparatively simple, consisting as may be seen by the accompanying illustration, of a disk of any diameter revolving upon a pin in the center. Figures in different poses of arrested action are painted or pasted upon the one side; under each figure is an oblong opening or slot. Much amusement can be derived from this old and simple toy. We herewith give one with the correct positions of a horse trotting 2:40 gait, drawn in silhouette upon the outer margin of the wheel.

Cut the phantasmoscope, or magic disk out, following the outer circle with the scissors; this done, paste the disk upon a circular piece of cardboard. Under each figure, at the oblong places, cut a corresponding opening through the paste board. Fasten the wheel to a stick or handle by means of a pin at its center on which it can freely turn. To use the toy, stand in

front of a mirror, as shown in the small illustration; hold the disk before the eyes, and look through the slots under the figures, and turn the wheel rapidly. The horses' legs will commence to move as in life, and as each successive position drawn upon the phantasmoscope is the exact one taken by a trotting horse, the horses in the mirror will all appear to be in actual motion on a fast trot. If the eye is directed over the margin of the pasteboard disk, an indistinct blur is all that is seen. The principle is generally well known and easily explained. It pertains to the phenomenon known as the persistence of vision. When the eye is directed through the slot the figure of a horse is seen for an instant as the opening passes the eye, and the impression is retained after the object is shut off by the intervening portion of the board between the slots until another horse appears through the succeeding opening, when an additional impression is made, the same as the preceding impression, except a slight change in the position of the legs. These impressions follow each other so rapidly that they produce upon the retina of the eye the effect of a continuous image of the horse, in which the limbs replaced by a succession of positions, present the appearance of a file of horses in actual motion.

For young scientists this beautiful experiment will be found very entertaining.—*Scientific American*.