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THE KINETOSCOPE STEREOPTICON.

Ever since the kinetoscope was brought to public attention and proved to be so popular, inventors have been striving to perfect apparatus for successfully projecting these miniature images upon the screen by means of a stereopticon producing the same effect of motion as in the kinetoscope. In the kinetoscope the successive images illuminated by reflected light are seen through a lens, enlarging them considerably, say from an image half an inch in diameter to about four inches. But the problem in the kinetoscope stereopticon was to successfully magnify these little images several thousand times and secure sufficient illumination on the screen to make them appear distinct and clear. Two factors in solving the problem have been the use of the electric arc lamp as an illuminant and of continuous transparent celluloid flexible films supporting the sensitive film and subsequent pictures, so that during this year several forms of apparatus have been invented, not only in this country but in England and France as well, for producing and projecting such miniature pictures. Most of our readers will recall the zoetrope toy, in which is placed a strip of pictures, the circumference of the cylinder being pierced with small vertical rectangular apertures. As the cylinder is rapidly rotated, the eye, in observing the pictures through the slits, only sees each picture the fraction of a second, and as one pic-

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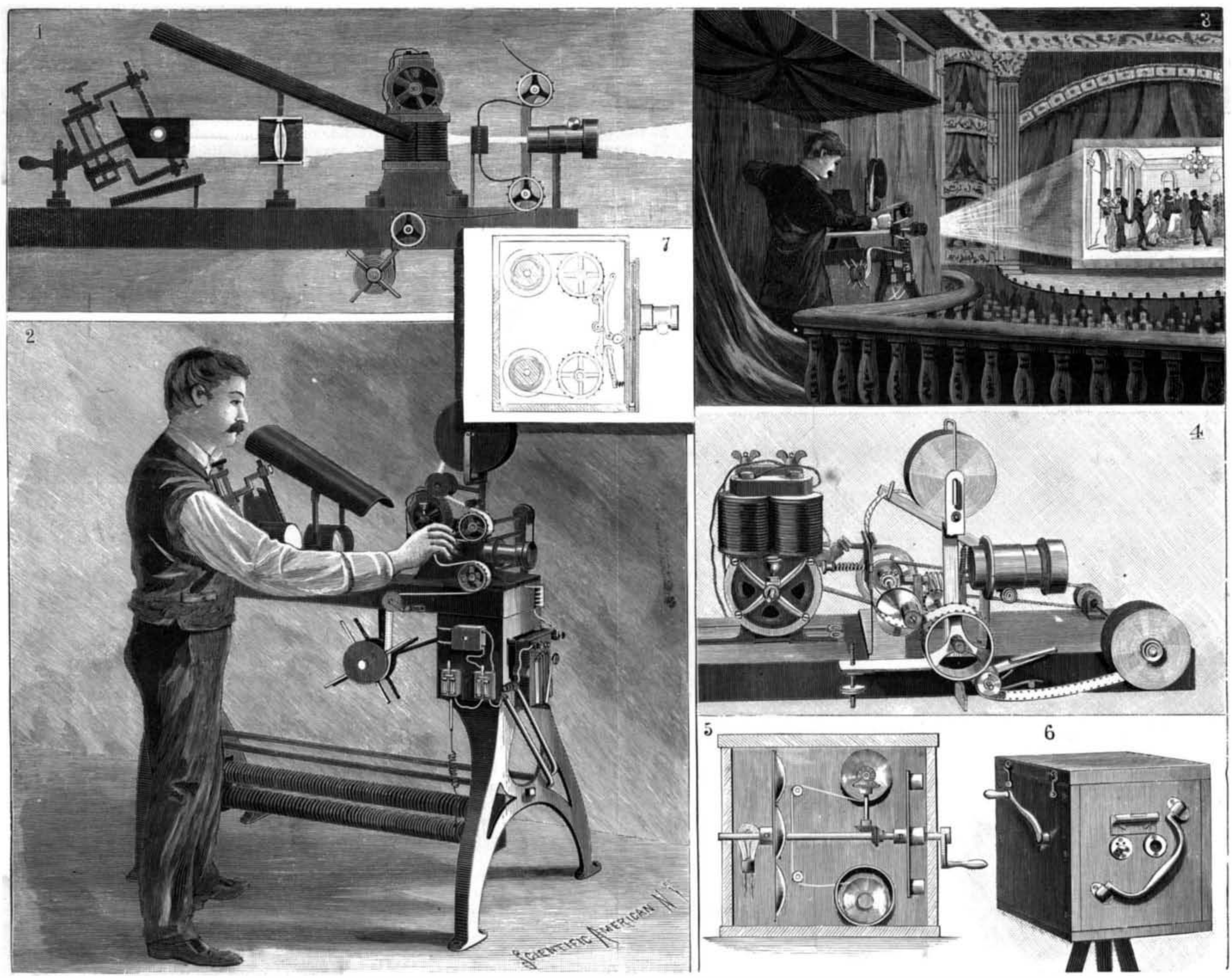
KINETOSCOPE PICTURES—PRACTICING PUTTING THE SHOT.



1, 2, and 3. Edison Vitascope. 4. The Jenkins Phantascope. 5 and 6. Jenkins Kinetoscope Camera. 7. Acres Projection Device.

APPARATUS FOR PROJECTING KINETOSCOPIC PICTURES.

THE KINETOSCOPE STEREOPTICON.

(Continued from first page.)

ture after another merges into the next, the sense of motion is conveyed to the brain. Carrying out this plan with scientific accuracy is what the kinetoscope and similar machines do. Various projecting machines have been introduced under such names as the vitascope, the phantascope, cinematographe, kineopticon and bioscope, and have been in use in several of the variety theaters of this city. Our illustrations describe more particularly the vitascope, said to be designed by Mr. Edison, but which is similar in detail and construction to the phantascope invented by Mr. Charles F. Jenkins, who has originated new ideas concerning the details of projection and of the mode of taking the original pictures. Mr. Jenkins has furnished us with a series of photographs made with his camera, shown in our upper engraving. The various successive motions of "practicing putting the shot" are shown in these fifteen pictures, and may be traced by beginning at the lower left hand corner and reading upward for each column of pictures.

His device for taking the views is shown in Fig. 5, exterior Fig. 6. On a shaft is fixed a disk supporting four lenses, and geared to the shaft is a smaller shaft arranged vertically, engaging a bevel gear on the axis of the film-winding reel. As the shaft is revolved by the handle outside, the lenses are brought respectively behind the opening in the front of the box and transmit the momentary image, as they pass the opening, to the moving sensitive film going in the same direction as the moving lens and at the same speed, the exposed film at the same time being wound up on the top reel. With the same apparatus the positive pictures on a roll of film may be reeled off from one spool to the other, being projected by the electric light in the rear, and illuminated by the rotating condensers, one for each lens, to the eye looking through the lens aperture or upon a small screen, reproducing in sequence the motions as originally taken. By this method the use of slitted rotating disk shutters is avoided; there is greater illumination, more detail in the pictures and they may be made somewhat larger, which greatly assists in their better reproduction on the screen.

The pictures are made at the rate of twenty-five to a second, about three-quarters of an inch in diameter and one-quarter of an inch apart, on a continuous sensitized celluloid strip about one and a half inches wide, having perforations in its edges in which the sprocket wheels of the projecting device engage.

Fig. 1 shows the complete projecting apparatus having in the rear a compact Colt electric arc lamp, in front of that a condenser, next in advance of that the ribbon picture film traveling from the upper to the lower reel, and finally the lens for projecting the illuminated image on the screen. On the rear, between the condenser and film, is observed the electric motor for operating the feed mechanism. Fig. 2 is another view of the stand complete showing the resistance coil used to modify the strength of the current, running lengthwise between the two ends of the stand, switches, etc., for regulating the application of the current. The film, after passing behind the lens, is wound up on the reel below.

In Fig. 3 the use of the apparatus in a theater is shown. It is placed in a cabinet surrounded by curtains in an upper gallery, the images being thrown forward upon a screen erected on the stage. In projecting pictures of this kind it has been usual to employ shutters operating in unison with the movement of the picture ribbon, but after a series of experiments it was found the same effect of motion could be produced by causing the ribbon itself to have an intermittent movement without the use of shutters at all, which greatly simplified the apparatus. Allowing that twenty-five images pass before the lens per second, it has been ascertained that the picture may remain stationary $\frac{11}{12}$ of that interval and another picture substituted in the remaining $\frac{1}{12}$ of the interval without destroying the continuity of effect as observed by the eye. The film-working device, based on this idea, will be seen more in detail in Fig. 4. The electric motor operates a main shaft, to which is geared a worm engaging a gear on the shaft of the main sprocket pulley that draws the picture ribbon downward at a uniform speed. Back of this shaft may be seen the main shaft, intended to rotate rapidly, on the end of which is a disk having a roller eccentrically fixed thereto. Just behind this is the standard, supporting spring tension fingers through which the film passes.

The operation is as follows: From the supply reel at the top the picture ribbon passes downward through the spring tension fingers behind the lens, and, as it is drawn forward by the main sprocket pulley, is quickly pulled downward by each rotation of the rapidly moving eccentric roller on the disk, which movement changes one picture for another. The sprocket pulley meanwhile takes up the slack of the ribbon, so that at the next rotation the eccentric roller quickly pulls the film down and makes the change. From the sprocket pulley the film is carried to the winding reel, operated automatically from the main shaft by means of a pulley, or, when it is desired to repeat the subject over and over, the endless film is allowed to drop into folds in a box located under the sprocket pulley, passing out of the rear upward over pulleys, arranged above the tension spring fingers, downward between them again to the main pulley.

Fig. 7 is a diagram of a film-moving mechanism of an English inventor, Mr. Birt Acres, which has been successfully operated in London.

The picture film is taken from an upper reel passed over a sprocket pulley downward through a retaining clamp and over a second pulley at the bottom and winding reel. The film passes over both sprocket pulleys at a uniform speed, between a stationary and swinging clamp operated automatically from the shaft of the shutter and holds the film stationary when the opening of the shutter is behind the lens, during the interval the picture is projected on the screen. The clamp is then released, then the pivoted lever below, with a roller on the upper end and pulled inward at the other end by a spring, immediately takes up the slack (as shown by the dotted lines), and causes, by such sudden movement, the bringing of the next picture into position.

There are several plans for making the quick change necessary. That designed by Lumiere Brothers, of France, is said to be one of the most compact. The film is carried forward intermittently by a pawl and ratchet movement.

The effect of these enlarged pictures in motion on the screen is very pleasing and novel, those we have seen illustrating marching soldiers, railway trains approaching a station, street episodes, ocean surf, Niagara Falls, bathing scenes, dancing girls, and the life in aquariums being remarkably natural and effective.

Worked in unison with the phonograph, it may be possible in the near future to reproduce an opera, illustrating each movement of the actors, including the grimaces and peculiar expressions of their faces, assisting greatly thereby the understanding of the phonographic music.

What other possibilities may be in store for these twin instruments remains for future developments to determine. The kinetoscope stereopticon may certainly be set down as one of the novel improvements for the year 1896.

Removable Backing for Dry Plates.

The most common complaint, in reference to backing plates to prevent halation, seems to be the "messiness" of applying the mixture to the glass. Personally, we find none of this annoyance; and we believe that others who have ever actually undertaken to back a plate realize that there is really very little mess or trouble about the operation. The universal demand is for a sort of removable backing that can be attached to a plate in an instant and stripped off as quickly; but these, as a rule, are rarely effective.

The following plan, recommended by Dementjeff, looks more promising than any other we have yet heard of:

A sheet of glass is cleaned and talced, and the talc is removed from the edges to the width of about a quarter of an inch. The plate is then coated with enamel collodion and allowed to dry; it is then placed on a leveling stand and coated with a 10 per cent gelatine solution to which a little glycerine has been added.

When this substratum is dry, the plate is coated with colored gelatine, prepared as follows:

Twelve parts of gelatine are allowed to swell in 90 parts of water, melted in a water bath, and then 8 parts of sugar and 80 parts of glycerine are added. The mixture is then colored with aurine, chrysoidine, and methyl violet; the following proportions being used:

Gelatine solution (as above)....	60 parts.
Saturated alcoholic solution of chrysoidine....	2 "
" " " aurine.......	2 "
" " " methyl violet.......	½ "

The film will be in proper condition for use in about two days, when it may be stripped from the glass and cut into suitable sizes. It is used as a backing, by merely squeegeeing into contact with the back of the plate with a roller squeegee. It can be easily stripped after use, leaves no stain, and may be used again and again.—The Amateur Photographer.

MANY physicians, according to a lecturer on dietetics, are ordering thin bread and butter for delicate patients, especially those suffering from dyspepsia, consumption, and anæmia, or any who need to take on flesh. This thin bread and butter insensibly induces persons to eat much more butter than they have any idea of. It is extraordinary, says the lecturer, how short a way a pat of fresh butter will go if spread on a number of thin slices of bread. This is one advantage, and a great one, in the feeding of invalids, for they are thereby provided with an excellent form of the fat which is so essential for their nutrition in a way that lures them to take it without rebellion. But the thin bread and butter has another advantage equally as great—it is very digestible and easily assimilated. Fresh butter made from cream is very much more digestible when spread upon thin slices of bread than the same amount of cream eaten as cream, per se, would be.

Correspondence.

The Scientific American Supplement as an Archæological Journal.

To the Editor of the SCIENTIFIC AMERICAN:

Two large and well sustained literary societies in the city in which the writer lives were recently engaged in an antiquarian research of considerable range, and while in pursuit of authentic and up-to-date archæological matter, found that the SCIENTIFIC AMERICAN SUPPLEMENT afforded more news and more substantial information in that field of inquiry than all other publications in America put together.

Pages upon pages of its ample volumes, during the last twenty years, have been devoted to the most entertaining, not to say fascinating, descriptions and illustrations of discoveries in Assyria, Babylonia, Egypt, Yucatan, Peru, Mexico, and indeed in every land in which the archæologist has delved to reveal the treasures of his science or lift the incubus of error and doubt from the pages of history.

More than fifty articles have appeared in the SUPPLEMENT on Egypt alone within the period named, and on other fields in similar proportion. Has this generous and persistent labor in the dissemination of knowledge been properly appreciated or encouraged? It is hoped that the rapidly increasing interest in archæological studies during the last few years will soon bring the deserved reward and stimulate further effort in popularizing a science by whose lamps only can we learn what man is by what man has been.

I have a hundred volumes of the three editions of your journal, all bound and convenient for reference, and find that no cyclopedia is equal to them.

Defiance, O. CHARLES SEYMOUR.

Non-conductive Glass.

The Illustrirtes Fachblatt notes a new variety of window glass invented by Richard Szigmondy, of Vienna, the peculiar virtue of which is its non-conductivity for heat rays. It is stated that a light of glass a quarter inch thick absorbs 87 to 100 per cent of the heat striking it, in contrast to plate glass, which absorbs only about 5 per cent. This glass is to give us a window which will keep our dwellings warm in winter and cool in summer, and be especially adapted to skylights, etc., and also to blue glass spectacles for the use of furnace men. In noticing this invention, it might be well to call attention to the peculiar conducting power of ordinary glass, which would seem to render Szigmondy's glass an impossibility in some of its claims at least. If we stand by a window on which the sun shines, we may feel the warmth of the sun, but if we touch the window pane, we find it cold. If we now take a light of glass and place it between us and an ordinary open fire, it will screen us from the heat, but will become rapidly heated itself. In the first case it transmitted most of the heat, and in the latter it absorbed. Plate glass may absorb but 5 per cent of sun heat, but it absorbs 94 per cent of heat from a source of 400°. In general it might be stated that glass transmits the luminous heat rays, and absorbs the non-luminous rays, and this is why a light, sunshiny room is so warm in winter. The glass transmits the heat of the sun and absorbs the heat of the fire. If Szigmondy's glass is opaque to luminous rays, it will keep a house cool in summer, but tend to make it warmer in winter, as glass non-conductive at one time is non-conductive at all times. We should be interested to know of the satisfaction it gives in actual use.

How Gold was Deposited.

An exhibition of the greatest interest to mineralogists and practical miners in relation to the much argued question as to how gold was originally deposited in auriferous quartz is reported from the Imperial Institute at Edinburgh, Scotland, says the Electrical Age. J. C. F. Johnson, of Adelaide, Australia, who has given great attention to the subject, exhibited specimens of non-gold-bearing stones in which he has artificially introduced gold in interstices and on the face in such a manner as to defy detection, even by skilled experts. Some of these specimens were shown privately to several distinguished geologists, who expressed great surprise at the remarkable character of the exhibition. The discovery, some years ago, that gold could be induced to deposit from its mineral salt to the metallic state on any suitable base, such as iron sulphide, led Mr. Johnson to experiment with various salts of gold, and by which he has produced most natural looking specimens of auriferous quartz from stone which from previous assay contained no trace of gold. Moreover, the gold, which penetrates the stone in such a thorough manner, assumes some of the more natural forms. In one specimen shown the gold not only appears on the surface, but penetrates each of the laminations, as was proved by breaking. While this knowledge of how gold was probably deposited may help to suggest how it may be economically extracted, the thought also occurs what a power for harm it would be, in unscrupulous hands, for the fraudulent "salting" of mines.