Wonders of the kinetoscope.: Edison's Latest Invention. New York Sun
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Thomas A. Edison, the inventor, consented recently to tell the public just exactly what he has accomplished in reproducing the motions of an object by photography. This is the first direct announcement that the new kinetograph, as the photographic apparatus is called, has proven successful after his years of study. Everybody has seen the nickel-in-the-slot machines which contain phonographs and play any kind of tune previously sung into them. Mr. Edison has now ready for the market a similar machine containing his moving pictures, which is set a-going when a nickel is put into the slot. This machine he calls a kinetoscope. The kinetograph is the machine which takes the photographs, and the kinetoscope the machine which displays them to the eye.

In the top of the kinetoscope, which is a polished oak box just like the phonograph machines, is a peephole about two inches long and half an inch broad, covered with glass. The interior of the box is lighted by electricity, and shows a picture about two inches broad and one inch high. The kinetoscope in Mr. Edison's workshop, which was exhibited by W. Heiz, the workman in charge of this department, contains a picture of a barber shop. There is the barber, about one inch in height, standing at his chair, and three victims waiting to be shaved. But waiting is not the correct word to use of this picture. One of the liliputian actors rises and walks across the picture to the chair, sits down, and is tilted back. The aprons and towels are adjusted in a trice with no gentleness (it is a five-cent shop), and the hand of the barber moves professionally over the patron's face and under the chin before the proper razor is chosen. The razor is slapped vigorously over the strap a few times, and then begins a five-cent shave that resembles the swing of a scythe in the hands of a farmer. The victim writhes in his chair, but he has to stand it.

Just at this moment one of the waiting manikins, who has picked up a newspaper and has been reading, is attacked with a fit of laughter at something he sees, rises from the chair, slaps the paper, and, pointing to the place, hands the sheet to the other waiting customer, who rises, notes the place, resumes his seat, reads the paper, and also falls a victim to laughter. The barber all this time has been busy. He rubs the head of the man in the chair and combs his hair. One of the signs on the wall is suggestive. It reads:

With or Without—Chloroform?

Mr. Edison regards the nickel-in-the-slot machine as a mere toy. That is not what he is after, although it is entertaining. He said:

"Some time ago it occurred to me that it might be possible to invent something that would do for the eye what the phonograph does for the ear, an instrument in fact that would faithfully record and reproduce practically all motion. I was familiar with the zeotrope, an instrument on which certain pictures were painted, and which seemed to give the figures a sort of motion, and I was also very much interested in the experiments of Muybridge, who photographed horses in motion by instantaneous photography, and reproduced the movements, but all these were very crude and resulted in jerky motions. The eye is too quick for such photographs. I saw that to produce pure motion pictures must be taken with sufficient rapidity to record movements of less than an inch in any part of the body, a longer movement than that producing a jar, which destroyed the illusions. Then began a series of experiments in photographing moving objects, and we got our apparatus to take twenty-five different photographs in a second, but this was not sufficient. I found that the human retina was capable of taking about forty-five or forty-six photographs and communicating them to the brain. Any more rapid photography was lost upon the brain. Of course perceptions differ in different individuals. Some men on looking at twenty-five photographs a second regard them as continuous, and others are expert enough to detect the differences even when forty-six a second are displayed. But forty-six a second is practically continuous for the average eye and brain. That will record every motion, every change of facial expression. An exception to this statement is the hand of the pianoforte player. In order to get every motion of an expert pianist, including the movements of the fingers, between sixty-five and seventy photographs a second are required.

"The difficulty was to give a sufficient exposure even for the best instantaneous photographic apparatus. It is necessary for a good picture that the gelatine plate should be allowed to have a certain fraction of time in which to record the rays of light that form the picture, and the great problem was to get an electrical machine that would move the gelatine plate along so rapidly between exposures that forty-six pictures a second could be taken and enough time could be given for each picture to be taken properly. I found that if a plate were exposed the sixtieth part of a second to a scene that was very light, with a very dark background, a perfect photograph resulted. It was but a simple process then to figure out how fast the machine would have to run between exposures to give forty-six pictures, each a sixtieth part of a second exposure. I figured that it would have to move from one exposure to another in one one-hundred-and-eighty-fifth of a second. That is to say, the instrument must be standing still for exposure three-fourths of the second and must be racing along at an enormous rate of speed the rest of the second so as to get the whole forty-six plates properly placed for exposure. It was a difficult job, a mighty difficult job, not to figure this out, but to get a machine that would do the work. When we got the requisite number of pictures we found they showed with a slight tremor when we put them in a kinetoscope. That was because they had not been focused exactly the same. If one picture is a thousandth part of an inch out of the exact lines of the preceding picture, the sensitive eye instantly notices a tremor of the picture which effectually destroys the illusion of the reproduction.

"That is the whole story," continued the inventor. "The photographing machine was the difficult thing. The various devices for properly displaying the moving scenes is of secondary importance, a mere feat in simple mechanics which anybody can do. You have seen the nickel-in-the-slot machine. Funny toy. 'With or with-

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out chloroform?' But that is not what I am after. I am going to do what I set out to do. My experiments with the kinetoscope have been directed toward this end: First, to mount the photographs on glass plates and throw the pictures by means of a magic lantern upon a screen. Then, instead of looking into a peephole, a large number of spectators might watch the moving picture. Second, to combine the phonograph with the kinetoscope so that while the figures had visible motion on the curtain their words might be heard plainly by the audience. I am prepared to announce that this throwing of pictures upon a screen has actually been accomplished in my laboratory, and we have had the figures in motion there so that the eye could detect no change from one picture to another. There are various improvements yet to be made, however, before this form of the kinetoscope will be ready for the public. When these things are all accomplished, as they will be some time, it will be possible to catch every gesture of Chauncey M. Depew delivering an after-dinner address, and every inflection of his voice, and to exhibit both to admiring audiences a hundred years after he is dead. It will be possible to see and hear grand opera by stereopticon. This has been largely a work of sentiment on my part. I do not believe there is much money in it. But I believe it is in the interest of science and history. A great man will never die if his pictures and speeches are saved for posterity by the kinetograph and phonograph."

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