

analogy, and said his opinion was that, as sound waves are inscribed on the phonograph diaphragm, so light waves were impressed on the film after reflection. A simple and telling experiment demonstrated to the audience that waves are both direct and reflecting, and at certain positions, where the two sets of waves meet, there is what is known as standing waves. A long india-rubber tube, attached near the ceiling, was set in motion from the floor, and the waves ran up to the top, and then returned in complimentary waves. By increasing the motion loops were formed of these waves, and at definite intervals there was no motion. The mercury reflector sent the waves of light back, and at half-wave lengths of the incident rays the colors of those rays proceeding from the object were impressed on the sensitive film.

The interference of light was well shown by making a sensitive film damp and placing it in the rays of the electric lamp in the opaque lantern. As the film dried, most beautiful colors were shown on the screen.

The best sensitive plates for the purpose of color photography by this method are gelatine bromide, with gelatine in excess to about thirty per cent. by weight, and an ideal plate should be perfectly isochromatic.

As M. Lippmann had been at work ten years before he hit on this happy idea of the mercurial reflector and modified plate, it proves the old adage of perseverance, and that the try, try, try again policy nearly always leads to success.

FIFTY YEARS OF PHOTOGRAPHY.

In the entire range of invention and discovery, nothing shows a more brilliant series of successes than the art of photography.

A hundred and fifty years ago, says a writer in *The Scientific American*,

copies of writing had been made by the action of light on sensitive paper. Giambattista Porta had invented the camera obscura; and more recently Niepce and Daguerre, by different methods, had succeeded in making sun pictures; and Fox Talbot had invented the calotype or talbotype; Herschel had given to the impression made from the object the name "negative," and to the print from the negative the name "positive."

Discovery of Pyroxylin.

Fifty years ago, in 1846, Schonbein discovered gun cotton, and soon after collodion was produced by making a solution of gun cotton in alcohol and ether. It was almost immediately adopted by Archer for a film in lieu of albumen and gelatine. Pictures produced on the sensitive film having collodion as the basis superseded the calotype and daguerrotype, and were made almost exclusively after this discovery up to within fifteen or sixteen years. This film is still used by many photographers for special purposes, but more particularly in photo-engraving, and for transparencies and lantern slides. The collodion film was used for making negatives as well as positives; some of the best photographic pictures ever produced were made by means of wet-plate collodion film negatives, albumenized paper being used in making the positive prints. Prior to the use of albumenized paper sensitized with the silver salts, glass positives, called ambrotypes, were introduced by making a very thin negative image and backing the plate with asphaltum varnish or black velvet, the black background producing a positive effect. In some cases they were bleached by means of a solution of mercuric chloride. Collodion positives are still made upon thin japanned iron, commonly called tintypes.

The Dry Plate.

After a great many experiments the modern dry plate was produced,