

MOVING PICTURES THAT SING AND TALK.

BY THE PARIS CORRESPONDENT OF THE SCIENTIFIC AMERICAN.

In view of the success which is obtained by the moving picture apparatus, the idea naturally occurred to use the phonograph in connection with it, so as to hear the voice at the same time that we see the picture upon the screen. Among such devices we may mention one brought out by Pathé. It is the invention of Capt. Couade. In his method, the actor utters the words or song into the phonograph, but without the gestures or facial expression.

The actor takes his position before the camera and his movements are photographed. Coupled with the moving picture machine is the phonograph of the flat disk type which was before used. A jointed rod coupling is used in order to connect the phonograph mechanism with the picture machine, and the latter is driven by a small electric motor. While the phonograph is repeating the actor's words, he goes through the necessary motions to accompany the words. The moving picture machine thus secures the photographic record of the series of gestures during the whole time that the phonograph disk is working.

In reproducing the two records at exactly the same rate of movement, the moving picture machine is placed as usual at a point behind the audience at the back of the hall, while the phonograph is located near the screen. The weight-driven mechanism of the phonograph is coupled to a revolving electric device which serves to produce a current, and this current is sent to the moving picture machine. In the latter there is mounted an electric motor, which drives the machine. As this motor receives current from the elec-

In a paper recently presented to the French Academy of Sciences, Esclangon dispenses with the upward flow and shows that every variation of the velocity of the wind, in magnitude or direction, from its mean horizontal velocity may, in theory, be utilized as a motive power by a soaring bird or an aeroplane. Every such variation increases the total energy of the system composed of the aeroplane and the surrounding air, and every such increase in energy can be transformed either into the kinetic energy of speed or into the potential energy of elevation. In order to reduce to a minimum the power required to propel an aeroplane, it will be necessary, first, to learn how to convert speed into elevation, and conversely, with little loss of energy, and secondly, to devise aeroplanes which, like birds, shall be able to adapt themselves instantly to changed conditions, so as to utilize the incessant fluctuations of the wind. The practical solution of the latter problem will undoubtedly present great difficulties.

Moving Pictures in Colors.

After the successful solution of the problem of color photography by the Lumière brothers, the problem of color chronophotography seemed to be nearing its final solution. But the practical difficulties encountered were far greater than in ordinary photography. Flexible films of 100 feet and more in length must be handled instead of glass plates of limited size. On the other hand the Lumière process is suitable only for the making of transparencies. Duplicate positives from a series of negatives are out of the question.

A novel system has recently been invented by a

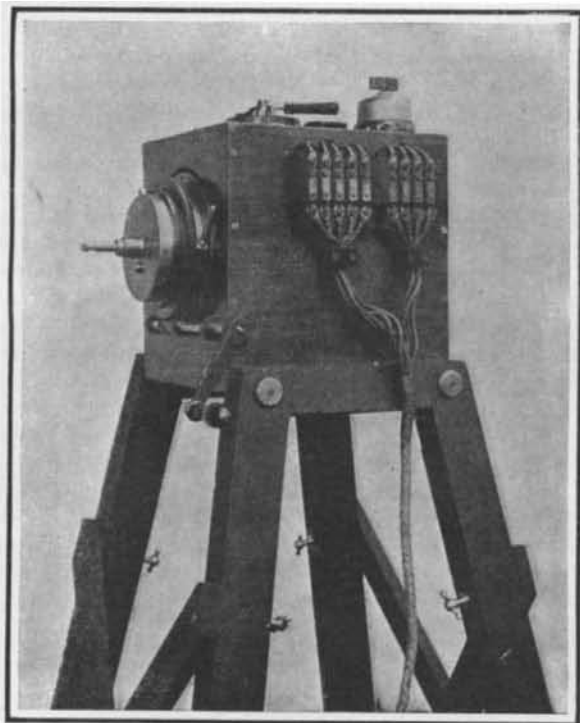
RETROSPECT OF THE YEAR 1908.

(Continued from page 3.)

daily, running on schedule speeds of from fifty-five to sixty miles an hour. At the same time, it should be borne in mind that there are no trains in the world that can compare in long-distance, high-speed runs with our eighteen-hour trains between New York and Chicago.

Electricity.

Unquestionably the most important work at the present time in the field of electricity is its substitution for steam locomotives in the operation of railroads; and of the many changes of this character which have recently been made, the most important are those on the New York Central and the New Haven railroads in this country. In respect of the great density of the traffic on these four-track systems, the conditions for electrification are highly favorable; but because of the many track complications involved at the terminal yards and stations, the work of installment and operation has been perplexing and difficult. The operation of the New York Central electric zone has been carried on through the year with the same smoothness and regularity which have marked this highly successful work from the very day of its opening. Save for the one disastrous accident at Woodlawn, which was due, in our opinion, to gross carelessness in operation, there have been no serious accidents attributable to the electrical equipment, and the number of delays has been less, we understand, than in the days of steam service. The attention of the electrical world has been focused



The motor in its portable case. The handle serves to operate the differential so as to keep the phonograph and moving picture apparatus in step.



The phonograph repeats the previously recorded utterances of the actor while he performs the necessary gestures in synchronism for the moving picture machine.



Weight-driven phonograph used to send a current into the distant moving picture machine motor.

MOVING PICTURES THAT SING AND TALK.

tric device on the phonograph, its speed is exactly the same as that of the phonograph. By this means we have a perfect concordance between the two apparatus.

Capt. Couade seems to have solved the problem of working the two machines in harmony. Both apparatus start up simultaneously and afterward run at the same speed, by simply placing the phonograph needle on a marked point of the disk and on the other hand using a marked image of the picture film at the same time. These points were previously obtained when the phonograph and picture machine were directly coupled by the shaft as above mentioned.

Capt. Couade's invention consists in the use of a revolving device which is driven by the weight mechanism of the phonograph. The device resembles a revolving commutator, and it receives direct current from the city mains and transforms it into alternating current. The motor is mounted in connection with the moving picture machine, and it consists of a simple two-pole electric motor which is arranged to run upon the three-phase current. Such a motor takes exactly the same speed as the driving mechanism of the phonograph.

Motorless Aeroplanes.

Is it possible to soar in the air for an indefinite time without motive power? Deprez in the SCIENTIFIC AMERICAN SUPPLEMENT has shown how the soaring flight of certain birds can be explained by the pressure of the air on the various parts of their bodies, provided that the surrounding air possesses some velocity in an upward direction. No such continuous upward flow of air has been detected by meteorological observations.

Roman painter, Signor Barricelli, for the cinematographic reproduction of animated scenes in their natural colors. The coloring of the films is obtained by means of the three-color process, but in a novel way. Instead of coloring the film itself, the inventor reaches his result by a rapid presentation of images, each of which is colored in one of the three fundamental colors (red, yellow, blue). By virtue of the well-known phenomenon of visual persistence, these images will give the impression of a complete three-color image.

In order to reproduce a given scene in its natural colors, it is sufficient to photograph the object three times through properly colored screens, each of which will allow only the light rays of a given color to pass. Thus three analytical color negatives are obtained. The corresponding positives printed from these negatives in black and white must be projected in rapid succession on a white wall, each through the same color screen used in obtaining the negative. The eye will then perceive a multi-colored image, provided the rate of succession be such that the individual impressions due to the various colors on the retina may superpose themselves on one another. The length of the photographic film as well as the speed of succession should accordingly be three times as great as in an ordinary cinematograph. The system adopted by Barricelli for insuring the succession of the various color screens in front of the objective, both during the taking of the views and during projection, is of remarkable simplicity. A glass disk divided into three colored sectors according to the fundamental colors, red, yellow, blue, is rotated in front of the objective so as to change the screen at each move of the cinematograph shutter.

more particularly, however, on the New Haven equipment, for the reason that here, for the first time, the experiment (and it was surely nothing more nor less than a gigantic experiment) was made of equipping a four-track road carrying an exceedingly dense traffic with a high-pressure monophasic system with overhead conductors. Toward the close of the year a remarkably candid and very detailed paper was read by the chief electrical engineer of the road, giving a history of the many obstacles encountered, and the way in which they have at last been successfully overcome. Serious troubles developed in the generators, in the line, and in the motors. Apparently these have been thoroughly mastered, and for some six months past the system has been running with a regularity which involves, according to the officials of the road, fewer delays than occurred in the days of steam service. What the technical world is waiting for, however, is the publication by the New York Central and the New Haven systems of the first cost and of the cost of operation of their respective plants. When these are available it will be possible to arrive at a pretty accurate estimate of the relative efficiency, under these particular conditions, of the single-phase and the direct-current systems. The present indications are that the direct-current is ideal for suburban and terminal roads, and the monophasic system for long-distance lines outside of the suburban zone. Hence, we are not surprised to learn that the Pennsylvania Railroad Company has decided to use the direct-current on its tunnel zone from Long Island City to Harrison, N. J., with the probability that the alternating current will be adopted when the electrification is extended to Philadelphia. A contract for the electrification of the tunnel zone has recently