one of two difficulties almost always arises: either the strip adheres firmly to the rigid base, comes under increasing tension as it dries and finally tears or, alternatively, it becomes detached along its edges which curl up and the strips become distorted. The method we published for overcoming these difficulties is to strengthen the gel by impregnation with gelatin. Dr. Baur's method of starch-gel electrophoresis affords an alternative solution to this problem. He prepares his starch gel as a relatively large thin sheet on a cellulose backing and several hæmoglobin or serum specimens are run side by side on this sheet. The cellulose backing supports the gel and prevents tearing during manipulation and drying, and having several strips united in one sheet reduces the difficulty that arises from the curling edges.

It is possible to dry conventionally prepared strips by an adaptation of Dr. Baur's technique. The strips are soaked for a few hours in a solution containing 15 per cent glycerol and 3 per cent acetic acid, then placed between two strips of cellulose dialysis membrane, for example, Visking' tubing, which have been wetted in the same glycerol–acetic acid solution. The cellulose should overlap the starch by about 2 cm in all directions. The 'sandwich' of cellulose and starch is laid on a glass plate, air bubbles are squeezed out, and the cellulose fastened at its borders to the glass with spring clips.

Drying can be accelerated by the use of a warm air current, but the sandwich should be turned over once or twice during drying so that evaporation will occur alternately from the two surfaces; this is done to prevent the dried strips from curling. Strong pliable transparent strips are obtained in this manner, which is simpler than the gelatin method.

W. G. DANGERFIELD

Department of Pathology,
North Middlesex Hospital,
Edmonton,
London, N.18.

Double-exposure Photography

THE velocity of a moving object may be determined by taking two photographs of it on the same photographic emulsion separated by a known interval of time and measuring the distance through which the image has moved. Double-exposure photography of non-luminous objects can be carried out with transmitted light where the camera lens is presented with a silhouette of the object against a light background, or with some other type of lighting such as frontal illumination, where the object appears bright against a dark background.

Where transmitted light is used, double exposures cause each image to be partially fogged by the other exposure. The negative is consequently degraded, and the resulting increase in graininess limits the accuracy to which the edges of the images may be identified. This difficulty is obviated with the second type of lighting, but with the limitation that the displacement of the image must be greater than its dimension in the direction of movement. Because of their nature certain types of events require the two images to be partially or completely superimposed. For example, the movement of closely spaced particles produces a negative which is difficult to interpret if the displacement of each image is greater than its size. With other phenomena, such as crystal growth or dissolution, stationary objects grow or contract in size.

This problem can be resolved by using some form of colour separation[1-3] whereby each image may be individually examined. However, a simpler solution consists of using both forms of lighting according to the following procedure.

In Fig. 1, A is an object moving in the direction shown. A photograph is first taken with lamp (1) so that only the image of the object exposes the photographic emulsion in the camera. The second photograph is taken with lamp (2). This exposes the previously unexposed parts of the emulsion except for the silhouette of the second image. By this means, each image of the advancing boundary is unaffected by the other exposure. An example of a double-exposure photograph of a moving rod taken in this way is shown in Fig. 2. Corresponding photographs of the receding edge would be taken with the lamps employed in reverse order.

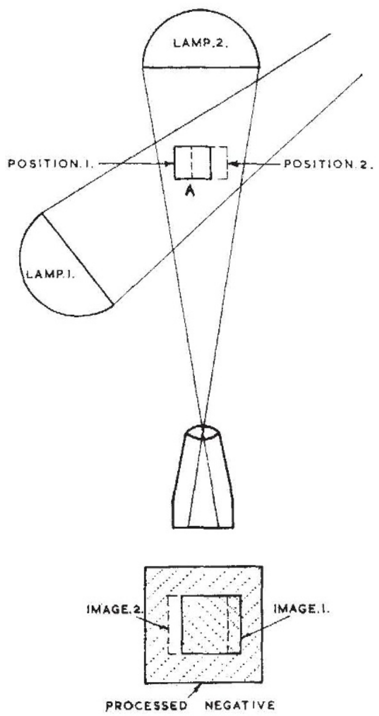
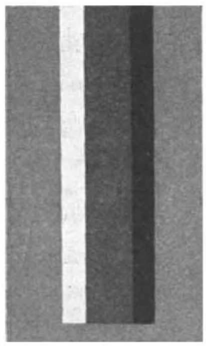


Fig. 1. Lighting arrangement for double-exposure photography



←
Direction of movement

Fig. 2. Double-exposure photograph of moving rod (negative print)

N. DOMBROWSKI
A. LEVY

Department of Chemical Engineering
and Chemical Technology,
Imperial College,
London, S.W.7.

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