The solution should wet the flake completely. A second drop placed on top of the snowflake is sometimes desirable, particularly if the flake has large proportions. After wetting the flake in this manner the solvent soon evaporates, leaving the snowflake encased within a shell of resin.

A 1 per cent. solution of polyvinyl formal resin designated as Formvar 15–95 dissolved in ethylene dichloride and cooled below 0° C. was found to produce excellent replicas. The thickness of such a replica is of the order of 20,000 Å U.

As soon as the solvent has evaporated, the slides may be removed to a warm place. The case may be protected from abrasion by covering with a transparent sheet of resin or a glass coverslip or slide.

Because of the simplicity of this technique the casting materials can be carried anywhere, thus greatly increasing the possibilities of obtaining unique specimens.

A slight modification of the method provides an equally easy way to make a permanent record of breath patterns and any other structures, such as frost crystals, hoar frost and similar perishable formations.

When molecular films are deposited on the plate, it is placed in the freezing compartment of a refrigerator, and upon cooling to about 10° C. is held for a brief moment in the presence of moist air (which forms the so-called "breath patterns"), replaced in the ice chamber and the condensate is frozen. Meanwhile the 1 per cent. solution is cooled below 0° C. The plate containing the frozen breath pattern or other formation is then dipped into the solution, removed and returned to the cold chamber until the solvent evaporates. A perfect replica remains after the plate is warmed and the water evaporates.

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THE USE OF INFRA-RED FILM FOR ELECTROPHORETIC AND ULTRACENTRIFUGAL ANALYSES

OPTICAL analysis in the air-driven ultracentrifuge or the Tiselius electrophoresis or diffusion apparatus is usually carried out in the visible region with some modification of the Töpler Schlieren method. Ultraviolet light, formerly employed for the examination of protein solutions by absorption recordings, is generally unsuited for the newer optical systems because of the expensive quartz lenses required.

We have encountered some difficulty in examining certain systems, particularly protein solutions containing dyes or bacterial pigments, because of their opacity to visible light. In overcoming this, advantage has been taken of the fact that many substances which absorb markedly in the visible region are transparent in the near infra-red. Thus even a deep brown solution of iodine in carbon tetrachloride is freely transparent to certain infra-red rays.[1]

The only modifications required in the new procedure are infra-red sensitive photographic films or plates, and a good source of infra-red radiation, such as a Nernst lamp, although satisfactory results can be obtained with an ordinary tungsten lamp. Infra-red plates and films are only slightly more expensive than panchromatic materials and can be obtained in a wide variety of sizes. They can be used in most cameras and plate holders although occasionally an older model may be found which is not infra-red "tight," with consequent general fogging. Theoretically, the focal length should be increased about 2 per cent. for infra-red work,[2] but in practice we have obtained sharp boundaries through visually opaque solutions without any disturbance of the usual focus of the ultracentrifuge or electrophoresis optical system.

As certain infra-red sensitized films and plates are sensitive to visual blue and red as well, filters may be necessary if the recording is to be made solely by infra-red radiation. In most cases the solution to be examined will serve as the filter. Exposures made by infra-red light alone should be longer than for the visible region. Development and fixation are conducted as for panchromatic materials.

Our experience has been limited to the plates and films used in amateur photography, sensitized up to 8600 Å—an extension of 1600 Å above the visible red. Although these have proved satisfactory for our purposes the possibility exists that solutions might be encountered which absorb in the region 7000–8000 Å as well. For these some of the special far infra-red sensitized plates available may be indicated.

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[1] R. W. Wood, "Physical Optics," p. 15, New York: Macmillan, 1934.
[2] "Infrared Photography with Kodak Materials," Eastman Kodak Company, 1940.

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