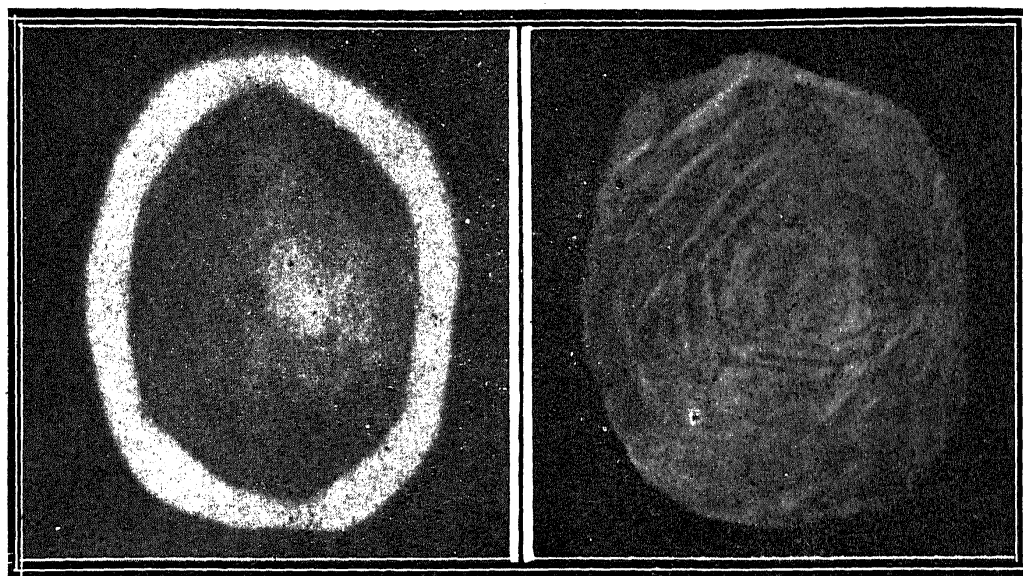


X-RAY TOPOGRAPHS OF DIAMOND

IN a recent paper¹ published by the Indian Academy of Sciences, and included in a Symposium on the Structure and Properties of Diamond, the author described a method by which any variations in the reflecting power of the lattice planes for X-rays which may exist over the area of a cleavage plate of diamond may be rendered evident. The technique

of the crystal can be obtained. Some 18 topographs of this kind were reproduced in the paper. Unfortunately, however, in obtaining these, duplitized X-ray films were employed with the result that there was a certain amount of blurring, and much of the detail was lost. It has since been found that greatly improved results are obtained by using photographic plates instead of films.

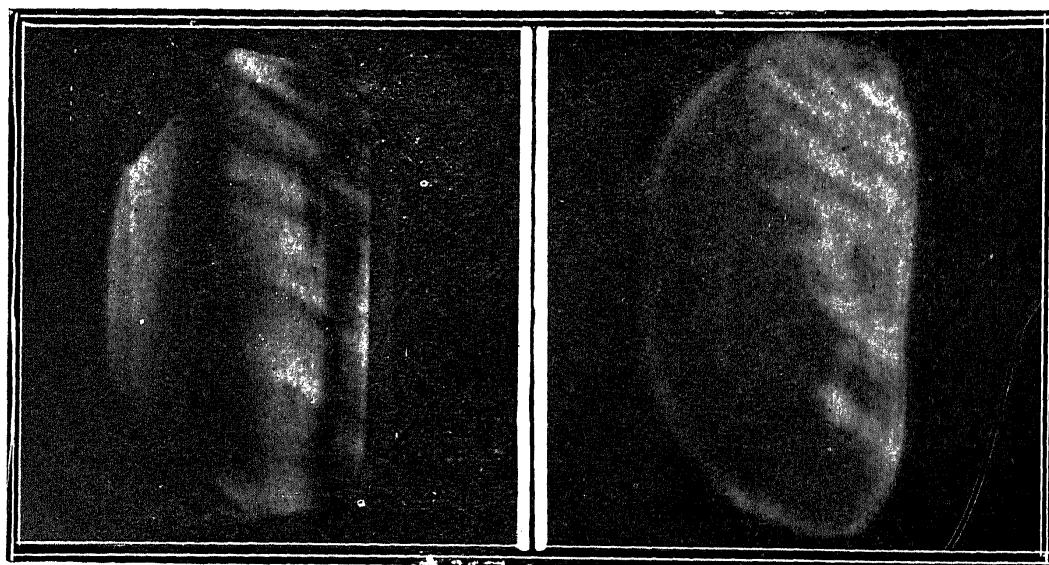
The remarkable relationship that exists be-



Luminescence Pattern

X-Ray Topograph

FIG. 1. Luminescence Pattern and X-Ray Topograph of D 188



Birefringence Pattern

X-Ray Topograph

FIG. 2. Birefringence Pattern and X-Ray Topograph of D 181

employed is based on the use of white X-radiation diverging from a pinhole, and thus giving a Laue reflection at a chosen set of lattice planes. By suitably tilting the crystal and the photographic film, a practically undistorted reproduction, or "X-ray topograph"

tween the X-ray topographs and the other patterns, such as the luminescence, the birefringence and the ultra-violet transparency patterns are best appreciated only when they are set side by side, with all the pictures enlarged to the same size, and arranged in the

same orientation. Since this is scarcely possible in the publication quoted above, two typical topographs of diamonds D188 and D181 are reproduced in Figs. 1 and 2 above, together with the corresponding luminescence pattern of the former, and the birefringence pattern of the latter, which were taken by Mr. G. R. Rendall. The topograph of D188 was taken with the new technique, and shows fine detail. A comparison of these patterns reveals the remarkable similarity that exists between them.

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June 14, 1944.

1. Ramachandran, G. N., *Proc. Ind. Acad. Sci.*, 1944, **A19**, 280.

RUPTURE OF WATER DROPS FALLING ON LIQUID SURFACES

THE present note contains preliminary observations on the rupture of water drops falling on liquid surfaces. Water drops of different sizes were allowed to fall from gradually increasing heights upon an oil surface. Observations show that for a given oil and for a given size of water drops, rupture takes place only when the drops fall from heights greater than a critical value.

An elegant method would no doubt be to study the phenomenon of rupture with the aid of high speed photography, recently developed to a considerable degree of perfection by H. E. Edgerton. In the absence of such a technique in this laboratory, only visual observations were made.

In the present investigation, kerosene, transformer oil and olive oil were employed. It was found that in the case of each oil mgh was nearly found to be constant, where m is the mass of the drop, g the acceleration due to gravity and h the critical height. The kinetic energy with which the drop should fall on the oil surface, in order that rupture may take place, should be greater than a critical value. This critical energy for a given drop varies with the nature of the oil and is probably connected with its surface tension and viscosity.

The critical energies for a drop of mass 0.825 gm. when falling upon kerosene, transformer oil and olive oil were found to be 240, 260 and 320 ergs respectively. The greater the viscosity of the oil, the larger is the value of the critical energy.

Further work is in progress and it is hoped to determine exactly the factors controlling the rupture of the drops.

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1. *Flash*, by Edgerton and J. R. Killian (Hale Cushman and Flint, Boston), 1939.

ETHYL ALCOHOL AS A SOLVENT FOR MODIFIED ROMANOWSKY STAINS

THE first worker to make use of a solvent other than water for dissolving the precipitate of compound stain produced by mixing methylene blue with eosin was Jenner (1899) who used methyl alcohol for this purpose. But since he did not use polychrome methylene blue for the preparation of his stain powder, therefore, his stain lacked the nuclear staining principle of Nocht's (1898) modified Romanowsky stain. Combining of Jenner's technique with Nocht's was taken up independently by Reuter (1901) and Leishman (1901). Reuter used absolute ethyl alcohol with aniline oil as the solvent whereas Leishman used the original methyl alcohol (Merck's "for analysis") of Jenner. But since in case of Reuter's technique a separate process of film fixation was always necessary, therefore his method did not become popular with people who preferred Leishman's method of fixing and staining in a single operation.

Since that date, all blood stains are, in general, modifications of the original Leishman's stain. Some of them, like Wright's and Wilson's stains, differing only in detail, whereas others, like Giemsa's and MacNeal's tetrachrome stains, are slightly different in composition. The solvent used for the preparation of solutions from these stains is, however, the same methyl alcohol as was originally used by Jenner or Leishman.

The difficulty in obtaining supplies of neutral acetone-free absolute methyl alcohol at reasonable prices for the preparation of blood stains led us to try experiments with a view to find out if absolute ethyl alcohol could be used in place of the expensive acetone-free methyl alcohol. As a result of these experiments we have seen that absolute ethyl alcohol can be safely substituted for the expensive methyl alcohol in the preparation of Leishman and Giemsa solutions. Ethyl alcohol, in fact, was found to possess a marked advantage over methyl alcohol when staining was to be done at higher atmospheric temperatures. Methyl alcohol being more volatile always gave a deposit of the stain on the film, but preparations with ethyl alcohol were free from this defect.

Various solutions of Leishman and Giemsa stains prepared with absolute ethyl alcohol were repeatedly tested for the staining of malarial blood. The technique followed being identical with the original formulæ of Leishman and Giemsa. In no case preparations inferior to those obtained with solutions containing methyl alcohol were obtained. In case of Giemsa solution, where fixation of thin smears is done separately and that of thick smears is unnecessary, the ordinary lime-distilled rectified spirit gave excellent results.

In view of the above results we are inclined to believe that:—

- (1) The use of expensive acetone-free methyl alcohol for the preparation of blood stains as specified in literature is only incidental and not very necessary.