Letters to the Editor.

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Complete Spectral Diagrams of Crystals.

IN NATURE of Dec. 21, 1929 (vol. 124, p. 946), W. Linnik describes a complete spectral diagram¹ of quartz produced by a conical X-ray pencil, which pencil is obtained by the movement in two directions of a narrow pencil about a point. The rays reflected

FIG. 1.

from inside the crystal come out on the side of the crystal opposite the source of rays and fall on a photographic plate. A screen is moved with the ray and prevents the direct unreflected pencil from falling on the plate.

This method permits the production only of a very

FIG. 2.

limited part of the complete spectral diagram. Far more complete diagrams, as shown in Figs. 1, 2, and 3, are obtained by reflection at the surface of a rock-salt crystal backwards by using a very broad conical pencil. Fig. 6 of Seemann² shows the arrangement of apparatus to produce such diagrams, provided that the photographic plate is placed parallel to the surface of the crystal and not perpendicular.

No. 3162, Vol. 125]

The chief difference from Linnik's diagrams consists in the presence of closed circles and ellipses. The short hyperbolic segments of Linnik are only present in Fig. 2 within the two circles. In Fig. 2 the focus was in the plane of the photographic plate in Figs. 1 and 3 it was not in this plane. In addition to this, the

FIG. 3.

distances between the crystal and the point focus of the X-ray tube, and between the former and the photographic plate, were different in the three diagrams. A screen or diaphragm is not used in this method, and all parts of the apparatus are kept fixed during the exposure.

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¹ H. Seemann, *Physik. Zeitschr.*, **20**, 169-175; 1919.

² H. Seemann, *Ann. Physik*, **53**, 461-491; 1917.

Adsorption from Solutions containing Two Solutes.

ACCORDING to Gibbs's theory of capillarity, since the surface energy of a solution is at the minimum compatible with the other conditions of equilibrium, a substance which lowers the surface tension will be present at the interface in greater amount than in the bulk of the solution. If two solutes are present, both of which lower the surface tension, it might be expected that that which causes the greatest surface tension lowering will be adsorbed to a relatively greater extent than the other. If the difference is considerable, we may get the almost exclusive adsorption of the more active substance.

We have determined, by means of the capillary electrometer, the surface tension lowerings produced at polarised mercury surfaces by solutions containing two surface-active substances, and have found cases in which the lowering caused by the mixture is identical with that produced by the more active substance, when present alone. For example, $M/20$ sodium *o*-toluate by itself causes smaller surface tension lowerings than $M/20$ sodium cinnamate at all potential differences (Fig. 1), and the electro-capillary curve of the mixture is identical with that of $M/20$ sodium cinnamate. When the sodium cinnamate concentration is reduced, while that of the toluate remains constant, the curve of the mixture remains identical with that of the cinnamate to below $M/50$. With $M/60$ sodium cinnamate, the effect of $M/20$ sodium toluate first becomes observable.