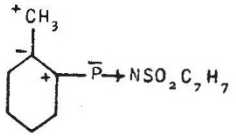
with (*A*) and the corresponding hydroxy-sulphonamide, $(C_7H_7)_3P(OH).NHSO_2C_7H_7$, (*B*). Tri-*m*-tolylphosphine apparently gives no phosphinimine, the only product isolated being the hydroxysulphonamide isomeric with (*B*).



These results are apparently determined chiefly by the position of the methyl group relative to the phosphorus atom. The co-ordinate link in (*A*) will tend to give the P and N atoms a weak positive and negative charge respectively, $(C_7H_7)_3\overset{+}{P} \rightarrow \overset{-}{N}SO_2C_7H_7$; simultaneously, however, the polarity induced by the three *o*-methyl groups will tend to give the P atom a negative charge. The polarity of the co-ordinate link is thus suppressed and a stable phosphinimine results. In the *p*-compound, the effect of the methyl groups is similar but, owing to the greater distance involved, definitely weaker: hence the formation of both the phosphinimine and the hydroxysulphonamide. In the *m*-compound, however, the polarity induced by the methyl groups reinforces that of the co-ordinate link, and therefore, as with the arsines, the hydroxysulphonamide alone results.

This interpretation of our results obviously requires considerable further confirmation, which we are now seeking with aromatic phosphines containing other electropositive or electronegative groups: meanwhile, aliphatic phosphines apparently all give stable phosphinimines. We are also attempting to prepare a dissymmetric phosphinimine, $R_1R_2R_3P \rightarrow NSO_2C_7H_7$, in which R_1 contains an acidic or basic group for salt formation, since such a compound should clearly be capable of resolution into optically active forms.

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[1] Mann, *J. Chem. Soc.*, 958; 1932.

Multiple Laue Spots from Aluminium Crystals

INVESTIGATING the distribution of the intensity along the Laue spots from thick (6 mm.) deformed aluminium crystals, we have found that it depends strongly upon the degree of the plastic deformation. The spots from a thick undeformed crystal are elongated radially and uniformly black (Fig. 1). Each portion of the spot is formed by rays reflected from a corresponding region of the crystal along the beam. The spots from the same crystal only slightly plastically deformed (0·5 per cent) are no longer uniformly black (Fig. 2). The blackening increases on the ends of all spots and also in the inner parts of several spots. The spots become double or triple and similar to the multiple spots which have been described in other investigations[1]. This result indicates that the exterior layers, and certain layers situated inside, scatter more energy and therefore are more imperfect than other layers. We conclude that the degree of the plastic deformation and, therefore, the distribution of the residual stresses along the path of the beam are not uniform. The dependence of the doubling on the distance from the crystal to the photographic plate is an indication of the focusing property of the differently oriented blocks, situated along the path of the beam (the beam was one of small divergence). It seems that multiple Laue spots which have been described in previous investigations[1] may be due to the reversible or irreversible changes of the perfection of the crystals and also to the focusing in the case of the deformed crystals.

FIG. 1. Laue spots from an undeformed crystal.

FIG. 2. Laue spots from a deformed crystal.

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[1] Y. Sakisaka and I. Sumoto, *Proc. Phys.-Math. Soc. Japan*, (3), **15**, 211; 1931. C. S. Barret, *Phys. Rev.*, **38**, 832; 1931. I.-S. Cork, *Phys. Rev.*, **42**, 749; 1932.

Height of the Aurora in Canada

DURING the winter of 1932–33, a number of measurements of the height of the aurora borealis were made at Saskatoon (lat. 52° 07′ 53″ N., long. 106° 37′ 47″ W.). It was found that the height at which the lower limits of the auroral arcs and bands were most frequently seen was 105 km., a value in close agreement with that found by Størmer and others in Norway. Fig. 1 shows the distribution curve, the number of auroral points measured being plotted against their height in kilometres. In plotting this curve, 220 points were used and they were taken in 5 km. groups.

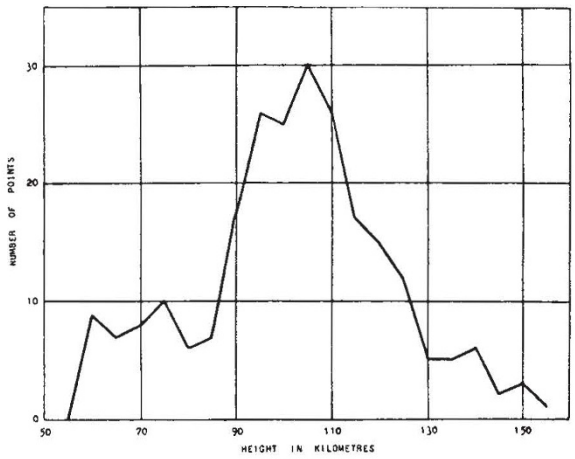

FIG. 1.