made on fast bromide paper using an electrically operated aircraft camera and an electronic trigger to brighten selected scans.

Performance is at present limited by imperfections of the order of 10 μ in the form of the chopping disk, which shows change-over disturbances varying from tooth to tooth, and by the fact that imperfections in cells and optical mixer prevent the attainment, at the spectrometer entrance slit and at the collimator, of radiation distributions identical for both beams. These set a limiting error in observing differences, over a normal scan, of 2 per cent of the total transmission. From traces I–IV reproduced here, it is seen that a recognizable spectrum (subject to solvent–solute interaction) of acetone in water is obtainable, the peak absorption difference being 5 per cent. Similarly, traces V–VIII (peak absorption difference 10 per cent) show that a chemical reaction in which the total change of transmission at the relevant absorption maximum is less than 5 per cent can be readily followed, but that extensive deviations from Beer's law may be the rule.

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E. F. DALY

Unicam Instruments (Cambridge), Ltd.,
Arbury Road, Cambridge. July 29.

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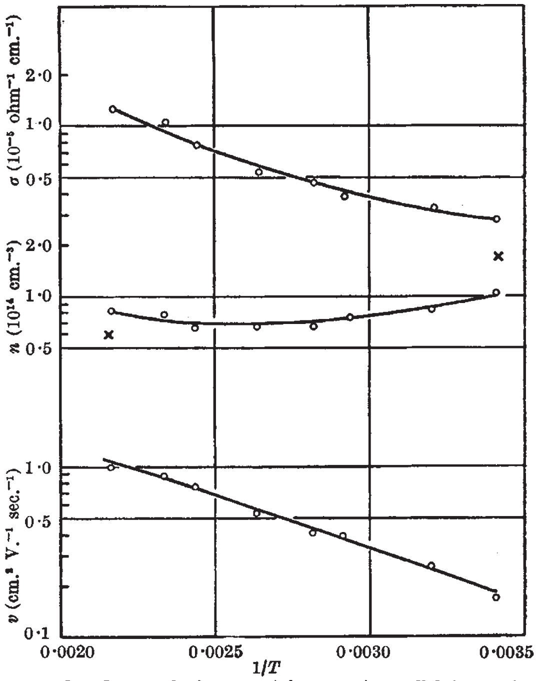
Hall Effect in a Selenium Single Crystal

In a recent communication[1], measurements of conductivity and thermo-electric power of selenium single crystals were reported. These have now been supplemented by a determination of the Hall effect on one such crystal. An A.C. method of measurement was used in which direct current was passed through the specimen held in a magnetic field alternating at 80 c./s. This was found necessary in order to reduce the noise-level below that of the signal.

Both the Hall effect and the thermo-electric power (θ) yield values for the concentration (n) of free electrons (or positive holes), the formula giving θ in terms of n and T being[2]

$$\theta = \frac{k}{e}\left(2 + \log \frac{2(2\pi mkT)^{3/2}}{h^3} - \log n\right).$$

A preliminary interpretation of the previous results of thermo-electric measurements along these lines yielded the rather surprising result that n is constant or even falls with increasing temperature, while the conductivity rises in the usual exponential manner. The Hall effect measurements, giving an independent value of n, have now confirmed this result, at least qualitatively. Thus, it appears that in selenium crystals the conductivity varies by virtue of the mobility rising exponentially with increasing temperature, while the value of n remains substantially constant. The accompanying diagram shows the conductivity σ, carrier concentration n (from Hall effect) and the derived mobility v plotted on logarithmic scales against $1/T$. The values of n obtained from the thermo-electric power are represented by the two crosses. (The experimental error in the n and v values by Hall effect and by thermo-electric power is about the same, ± 25 per cent.)



σ, n and v for a selenium crystal, current parallel to c-axis; ×—×—, values from thermo-electric power

The very low mobility and its variation with temperature support the hypothesis of internal barriers put forward by Müller[3] to account for the deviations from Ohm's law observed with selenium crystals.

Henkels[4] has recently published thermo-electric measurements on selenium and values of n and v derived from them. These are in agreement, well within an order of magnitude, with the results obtained here.

K. W. PLESSNER

Research Laboratory,
Associated Electrical Industries, Ltd.,
Aldermaston Court,
Aldermaston, Berks. July 31.

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Brillouin Components in Light Scattered by Quartz

It was first observed by Gross[1] that, when the 4358-A. line of mercury scattered by quartz is examined with a 30-step echelon grating, the line is found to be split up into a doublet, each component being shifted from the centre of the line by 0·18 A. He reported later[2] that the line is split up into six components. Krishnan and Chandrasekharan[3] have recently studied the structure of the 2536·5-A. line of mercury scattered by quartz and filtered through mercury vapour, using a 3-metre quartz spectrograph having a dispersion of 13 cm.$^{-1}$ per mm. in this region. They have observed a weak doublet, each