of the mean free path maximum, the following methods were used:

1. Determination of the halfwidth and the height of the open orbit resonance phenomena [11].
2. Eddy current resistivity measurements [12].

It has been shown that the halfwidth and height of the open orbit resonance are directly related to ql [13]. It is found that the open orbit resonance has a Lorentz shape and that the height of the resonance is proportional to ql while the width is inversely proportional to ql. Measurements of the height and halfwidth of the open orbit resonance as a function of temperature were made for each direction * in sample A and only a very slight anomalous behaviour could be detected, probably because the changes in height and width were quite small. In the higher purity sample B, however, definite indications of maxima in both height and the reciprocal of the halfwidth are observed. These are shown in fig. 2 in which the quantities are plotted as a function of temperature. The eddy current resistivity measurements were made in the usual way [12] on sample B; and, although they are crude as compared to the other results, a definite indication of a resistance minimum occurs at about 3°K. The results are shown in fig. 2 where the resistivity relative to that at 4.2°K is plotted as a function of temperature. It should be noted in regard to fig. 2 that high field measurements on sample B give maxima around 2°K whereas the open orbit resonance and resistivity measurement show maxima at about 3°K.

The resistance minimum effect has been discussed theoretically in several papers [14-17]. The effect is apparently caused by the presence of certain ferromagnetic or paramagnetic impurities which introduce a temperature dependent term to the resistance. The present sample A was spectrographically analysed and the major impurities found to be iron and lead. From the spectrographic analysis it was estimated that the iron concentration was about 10-20 parts per million. It thus appears that for extremely pure crystals, ferromagnetic impurities of concentrations a few parts per million can have definite effects on the transport properties.

Investigations with a high purity zinc single crystal also yield results showing a maximum in the mean free path at about 3.5°K.

A full account of the temperature variation of the mean free path in cadmium and zinc will be published elsewhere. It is hoped that a correlation can be found between the mean free paths determined by the magneto-acoustic technique and those derived from zero field conductivity measurements.

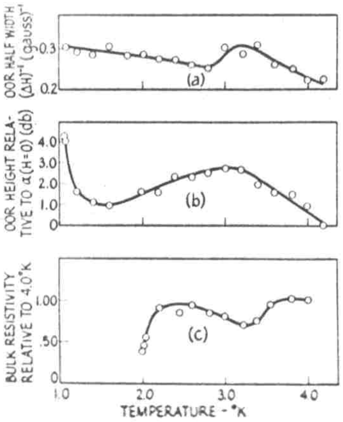

Fig. 2. a. The reciprocal of the halfwidth of the open orbit resonance in sample B for $q \parallel [10\bar{1}0]$, $H \parallel [\bar{1}2\bar{1}0]$.

b. The height of the open orbit resonance in sample B with respect to the zero field attenuation for the same configuration as that in (a).

c. Bulk resistivity of sample B as a function of temperature as measured by an eddy current technique.

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* The open orbit resonance in cadmium was reported earlier for the configuration q along $[\bar{1}2\bar{1}0]$ and H along $[10\bar{1}0]$. It has now been observed also for q along $[10\bar{1}0]$ and H along $[\bar{1}2\bar{1}0]$. The resonance is also seen for both configurations in zinc.