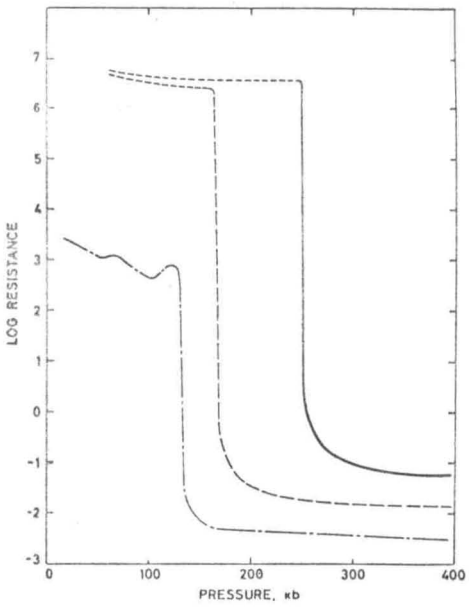

Fig. 6. *Resistance vs. pressure*
ZnS —— ZnSe — — — ZnTe - - - -

The data of Jayaraman *et al.*[9] for InSb indicate a triple point at 335° and about 20 kb with a solid—solid transition at room temperature and 23 kb. The data of Gebbie *et al.* [10] indicate that there is a large drop in resistance at this point. By analogy it is expected that a similar transition is occurring in these substances. Also, a microscopical examination of the samples after a run gave no indication of melting, although they were rather badly distorted on removal from the bomb so that the evidence is not clear-cut.

In the case of GaAs there is a sharp drop in resistance at 245 kb, a relatively small change to 280 kb, and a second drop of about an order of magnitude. It is speculated that here we are above the triple point at room temperature and that the region from 245—280 kb represents the liquid state. Both resistance measurements as a function of temperature and high-pressure *X*-ray measurements would be most desirable on this and the other zinc blende type compounds.

Fig. 7 shows the fractional change of optical absorption edge with pressure for TlCl, TlBr and TlI.[11] All of these have the simple cubic (CsCl) structure at high pressure. (TlI transforms to this structure at 5—6 kb.) All three exhibit a large red shift with pressure, the ratio of the slopes (TlI/TlBr/TlCl) being about 2·3/1·4/1·0.

Figs. 8—10[12] show the change of resistance with pressure at 25° and 120° (in the case of TlI, a 145° isotherm is also included). For the iodide there are three distinct regions: a very sharp drop with pressure up to about 90—100 kb, a second drop with about half the slope of the first part and, above 160 kb, a relatively small change of resistance with pressure. In the first region there is a decrease of resistance with increasing temperature. The activation energy is about 1·1 eV. In the second region there is a small but definite increase of resistance with temperature. In the third region there is a significant increase in resistance with temperature.

TlBr exhibits the same three regions, but the difference in slope between regions 1 and 2 is less distinct, and the transfer from region 2 to region 3 is less abrupt. In TlCl region 2 is no longer distinguishable, but the isotherms cross as for the other two compounds. The TlCl and TlBr have activation energies of 0·8—0·9 eV, in the low-pressure region.

Since these compounds were not intensively purified, the source of conduction electrons is almost certainly impurities. Nevertheless, in region 1, we are undoubtedly measuring an increase in carrier concentration with pressure, probably due to movement of the bottom of the conduction band with respect to impurity levels. The relative slopes of the log resistance versus pressure curves (TlI, TlBr, TlCl) are 2·7/1·2/1·0. This is quite comparable with the relative gap changes observed optically.

In region 2, one is undoubtedly observing primarily the increase in mobility with increasing pressure, probably due to broadening of the conduction band.

In region 3, the resistance is distinctly 'metallic' in its temperature behaviour. If one