

pressure induced change of resistance: if the proportions of the two phases change with pressure then our conclusion is invalid. It turns out that if we *assume* that the ratio of the resistivities of the two phases is independent of pressure, then quite a small change in the phase composition with pressure is sufficient to account for the apparent difference between the pressure coefficients of the two phases. For a 50-50 mixture of the two phases we find that at 20-35 °K the necessary change of composition is about 4% per 1000 atm, the change being such as to decrease the amount of close-packed phase present. The sign of this effect is consistent with the experiments of Basinski & Verdini (1959) on the specific volumes of the two phases of sodium. One also finds that a change of this amount would have only a small effect on the curvature of the resistivity-pressure relation. Our experiments on lithium show a similar effect and we believe that this is the more likely explanation of our results.

### 3.2.3. *The correction to constant density conditions*

This correction is made in the same way as for potassium. The results of the calculations are given in tables 6 and 8.

## 3.3. *Lithium*

The experiments on lithium proved to have several difficulties not found in those on potassium and sodium. In the first place the martensitic transformation, which occurs at about 75 °K in lithium, is more difficult to investigate than that in sodium (Dugdale & Gugan 1961); secondly, the changes of resistance with pressure are relatively small and therefore not easy to determine accurately; and thirdly, these small changes are also often very irregular, even in specimens containing only the pure b.c.c. phase (cf. Gugan & Dugdale 1958*a*). The results of the high pressure experiments were therefore often only of a qualitative nature, and although they showed several interesting new features, we shall discuss here only our simpler high pressure results. The specimens used for these measurements were similar to those used in our previous experiments on lithium (Dugdale & Gugan 1961; Dugdale *et al.* 1961).

### 3.3.1. *The temperature dependence of $\rho_i$ for lithium*

We have discussed this in detail elsewhere in connexion with the martensitic transformation in lithium (Dugdale & Gugan 1961), and with the isotope effect (Dugdale *et al.* 1961); the results are given in table 10.

There are not many measurements of the resistivity of b.c.c. lithium with which to compare our results. Kelly & MacDonald (1953) give results for lithium between 4.2 °K and the melting point but only in the form of a small diagram. Meissner & Voigt (1930) give some results in the neighbourhood of 80 °K which probably refer to the b.c.c. phase although this is not certain because the thermal history of their specimens is not given in detail. Other experimental work (cf. MacDonald & Mendelssohn 1950; MacDonald *et al.* 1956; Rosenberg 1956) has been concentrated in the low-temperature range, i.e. in the two-phase region. Our values at 80 °K are about 10% lower than the values of Meissner & Voigt; this is probably connected with