

$d \ln K/d \ln V$ changes due to the variation in the amplitude of the lattice vibrations, which have no counterpart in the thermoelectric powers, have been removed. In table 13 we make this comparison and in the last column we give the ratio $(d \ln K/d \ln V)/\alpha$ for the monovalent metals for which we have available reasonably reliable values of $d \ln K/d \ln V$. Since $d \ln E_F/d \ln V$ is $-\frac{2}{3}$ for quasi-free electrons, it is perhaps significant that for sodium and potassium, both of which approximate well to the free electron model of a metal, the ratio has a value of about -0.7 . This suggests that in these metals the dominant effect of the volume change on the electrons is simply to change their Fermi energy, E_F . The changes in electron properties which manifest themselves in the thermoelectric power then also manifest themselves in the changed electrical resistivity. Although this idea is attractive it is, as described in the introduction, hard to reconcile with the present theory of the volume dependence of electrical resistivity.

For the other monovalent metals the values of the ratio $(d \ln K/d \ln V)/\alpha$ are somewhat uncertain but they are all of comparable magnitude. It can at least be said that $d \ln K/d \ln V$ and α are closely related, and when the thermoelectric power of these metals is properly understood this should throw light on the magnitude of the pressure coefficient.

With regard to our earlier remarks about the minima in the resistance-pressure curves of the alkali metals, it follows that if there is a close relationship between $d \ln K/d \ln V$ and α , then when $d \ln K/d \ln V$ changes sign we might expect α also to change sign. Measurements on caesium at room temperature by Dugdale & Mundy (1961) show that this does indeed happen.

We are grateful to Dr D. K. C. MacDonald, F.R.S., for his encouragement and interest in this work. We should like to thank our colleagues in the laboratory for many valuable discussions and in particular Dr R. G. Chambers and Dr MacDonald for their comments on the manuscript. We are also indebted to Mr D. J. Huntley for help with the experiments, to Mr A. A. M. Croxon for much valuable technical help and to Mr F. W. Richardson for supplying liquid helium and hydrogen. One of us (D.G.) wishes to thank the University of Bristol for the award of an I.C.I. Fellowship during the tenure of which this work was finished.

APPENDIX A. THE TREATMENT OF THE EXPERIMENTAL DATA

(a) *The ideal resistivity of the b.c.c. phases as a function of temperature*

The immediate results given by our experiments were values of total resistance at temperature intervals of a few degrees for specimens of different shape factor. These we converted directly to resistivity-temperature results using the known equations of state (see appendix B). To convert from total resistivity to ideal resistivity we have in all cases subtracted the measured residual resistivity. This procedure is liable to lead to appreciable error for lithium because the observed residual resistance is that of a two-phase mixture and because lithium exhibits departures from Matthiessen's rule, but we believe that for our specimens the maximum error in our tabulated results (at 80 °K) is less than $\frac{1}{2}\%$ (cf. Dugdale & Guban 1961; Dugdale