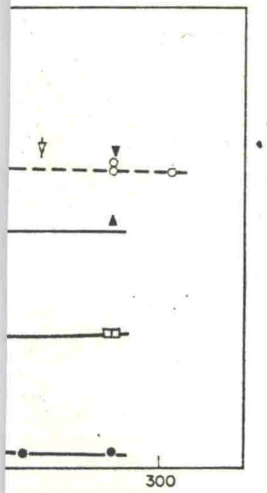
xpect a decrease of ϱ_{ph} with
y much bigger at low tem-
illustrates this in the alkali



istivity in the alkali metals as a
hillips, 1965.)

) (40)

and $f(T/\theta)$ is some universal
peratures and as T^6/θ^6 at low
proximately true for several
it is true for one metal under
endent on pressure) then we
o its temperature dependence
l Gugan, 1962):

$$\left(1 + \frac{\partial \ln \varrho_{ph}}{\partial \ln T}\right) \quad (41)$$

aracterizes the vibrational frequen-
onal to the force constants, i.e., to
with respect to distance. The effect
d hence to increase its curvature,

In this expression we are treating K and θ and hence their volume derivatives as independent of temperature. Consequently if the electrical resistivity follows a reduced equation of state of the form shown in equation (40), we expect a linear relationship between the logarithmic volume derivative of ϱ_{ph} and its logarithmic temperature derivative. This means that where the temperature dependence of ϱ_{ph} changes rapidly with temperature the volume dependence will likewise change rapidly.

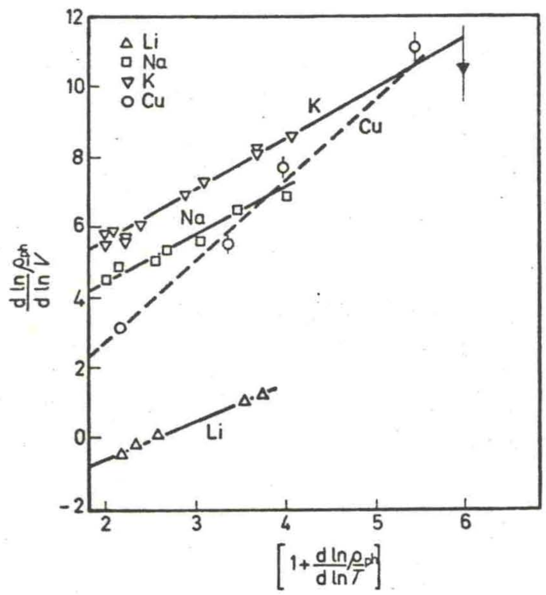


Fig. 21. Relationship between volume coefficient and temperature coefficient of resistivity. (From Dugdale, 1961.)

This relationship has been tested experimentally and the results are shown in Fig. 21 (Dugdale, 1961; Dugdale and Gugan, 1962). It is seen that a relationship of this kind does indeed hold. On the other hand we saw that the low-temperature behaviour of the electrical resistivity depended on both the shape of the Fermi surface and on the elastic anisotropy in a way that did not allow them to be separated in any simple fashion. This means that θ in equation (40) does not describe simply the *lattice* properties of the metal and so the reduced equation of state does not allow the lattice properties to be simply separated out from the electron properties as was originally hoped. The linear relationship in equation (41) is interesting and perhaps