n factor can be represented

$+\beta$ (31)

e and for lattice spacing reduced
pseudo-potential theory, and the
model form factor. (From Harri-

is given in Fig. 8. This is as
ifferent atomic volumes, the
o a 10% reduction in lattice
ve been calculated from the
e lines are derived from the
ion (31). In the second deri-
nstant. The parameters that
ce $\varepsilon(q)$. Thus apart from the
the Fermi energy and hence

s simplified model, the point
the effects of pressure on the

Fermi surface of the simpler metals. The general procedure is to choose a model form factor (e.g., of the Harrison type) and choose the parameters involved in it so that this form factor will reproduce what is known experimentally about the Fermi surface of the metal at normal pressure. As an example, $w(q)$ for Al would have to take on the values V_{111} and V_{200} (as calculated by Ashcroft, say) when q is equal in magnitude to the corresponding reciprocal lattice vectors. Then the new form factor corresponding to a different volume can be deduced from the original one by suitably changing k_F and hence the values of $\varepsilon(q)$.

Alternatively, the experimental results can be used to calculate how the important Fourier components of the pseudo-potential vary with volume. These values may then be compared with theoretical expectations.

In using a simplified version of the form factor, it should be remembered that because it has been chosen to fit the Fermi surface at a particular volume, this does not guarantee that it will be successful at a different volume even when the screening has been suitably altered. The simplified version of the form factor may contain unphysical assumptions that are concealed by the initial choice of parameters. The physically reasonable extrapolation to a different volume may then break down.

In what follows we shall compare theory and experiment for the metals Al, Pb and Zn. In this we shall essentially be considering to what extent a simplified form factor is successful in explaining the pressure dependence of certain features of their Fermi surfaces. We consider each of the metals in turn.

D. COMPARISON OF THEORY WITH EXPERIMENT

1. *Fermi Surface of Al under Pressure*

By way of illustration of the methods outlined above, let us consider first the Fermi surface of Al. The measurements by Melz (1966b) have already been referred to and we refer now to his calculations. These calculations were based generally on the calculations of the Fermi surface of Al made by Ashcroft (1963) which was itself an extension of earlier work by Harrison (1959, 1960).