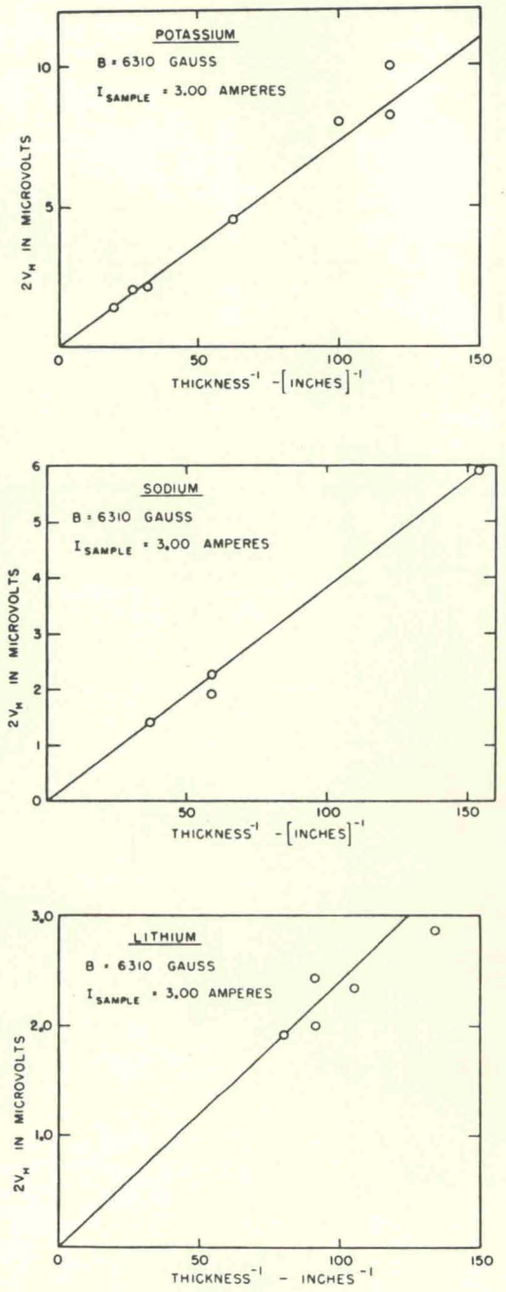

FIG. 8. $2V_H$ vs reciprocal thickness for sodium, lithium, and potassium.

DISCUSSION

The results of the pressure measurements show two important features. First, for the elements lithium, sodium, potassium, and rubidium the value of n^* decreases as the pressure increases. Second, in cesium n^* goes through a minimum as the pressure increases.

Equation (9) for n^* contains too many parameters to allow any conclusions to be drawn from the experimental data alone. However the computations of Ham can be used to obtain those parameters which describe the warping of the Fermi surface as a function of pressure; we shall see that not even the direction of the experimental effect can be explained on the basis of a pressure dependent warping of the Fermi surface alone and that the scattering time must also be highly anisotropic.

Ham's data give electron energy vs $ka/2\pi$, where a is the lattice constant, for the [100], [110], and [111] directions. If the Fermi energy is known, the length of the k vector to the Fermi surface can be obtained for the three principal directions and Eq. (4) used to compute k_0, A, and A_1. The Fermi energy may be obtained from the requirement that the volume in k space enclosed by the Fermi surface contain exactly one electronic state per atom. Using an expression for the volume enclosed by a surface of the form given by Eq. (4) one can show that for the values of the warping coefficients encountered in the alkalis the enclosed volume is, to better than 2%, just that of a sphere of radius k_0. The condition on the enclosed volume yields the requirement

$$k_0 a/2\pi = 0.62. \tag{12}$$

The Fermi energy was obtained simply by picking an energy for which the computed value of k_0 satisfied Eq. (12). The results of this procedure are given in Table III along with the values of $ak/2\pi$ for the three principal directions; the last figure on the values of A and A_1 is not justified by the precision of the fit but is given to avoid obscuring some of the changes in the warping parameters. In Table IV we give the warping parameters for lattice constants corresponding to atmospheric pressure and to 15 000 kg/cm², as obtained by a linear interpolation using the data in Table III.

The coefficients B and B_1 are not independent of A and A_1, but depend upon them through some rather cumbersome algebraic expressions. Table III shows that the k vectors for the [100] and [111] directions

TABLE III. Warping parameters for alkali metals computed from data of Ham.

Metal	a atomic units	$\frac{ak_{100}}{2\pi}$	$\frac{ak_{110}}{2\pi}$	$\frac{ak_{111}}{2\pi}$	A	A_1
Li	8.11	0.613	0.623	0.613	−0.002	−0.00[illegible]
	6.65	0.607	0.634	0.613	−0.011	−0.01[illegible]
	5.34	0.575	0.665	0.590	−0.031	−0.03[illegible]
Na	10.04	No anisotropy				
	8.11					
	6.65					
K	11.46	0.625	0.640	0.625	−0.003	−0.00[illegible]
	10.05	0.620	0.620	0.620	0	0
	8.11	0.585	0.675	0.575	−0.013	−0.04[illegible]
Rb	12.57	0.611	0.629	0.611	−0.004	−0.00[illegible]
	10.74	0.605	0.627	0.605	−0.005	−0.01[illegible]
	9.05	0.560	0.680	0.560	−0.028	−0.06[illegible]
Cs	13.35	0.600	0.655	0.600	−0.013	−0.07[illegible]
	11.46	0.580	0.670	0.580	−0.021	−0.06[illegible]
	10.04	0.495	0.655	0.495	−0.041	−0.08[illegible]