at the zone boundaries calculated using the different bare potentials and dielectric functions. We denote the longitudinal branches by L and the transverse branches by T_1 and T_2. The elastic constants and their pressure derivatives are treated similarly in table 3.

Table 1. Physical data and exchange–correlation parameters β at 80°K

	Unit	Na	Al	Pb
Volume of unit cell	a_0^3	254·5	110·7	203·4
Fermi wave number	a_0^{-1}	0·4882	0·9293	0·8351
Density	$g\,cm^{-3}$	1·01	2·73	11·50
Pressure to produce 1% compression	$10^8\,N\,m^{-2}$	0·70[a]	7·50[b]	4·04[b]
β_H (equation (5))	—	0·902	0·593	0·631
β_{AS} (equation (6))	—	0·454	0·475	0·473

a_0 is the Bohr radius (= 0·5292 Å). a, Beecroft and Swenson (1961); b, Munson and Barker (1966).

Table 2. Al phonon frequencies at the zone boundaries in units of 10^{13} rad s^{-1}

			100 L	100T	111L	111T
Experiment[a]			6·08	3·65	6·06	2·63
Calculations: potential	$f(q)$ (author and number of relevant equation in text)	β				
1. HA local	none	—	7·78	4·68	8·04	3·27
2. HA local	Hubbard (4)	Hubbard (5)	6·76	4·40	6·73	3·25
3. HA local	Hubbard (4)	Ashcroft and Shaw (6)	6·55	4·36	6·44	3·25
4. HA local	Shaw (7)	Ashcroft and Shaw (6)	6·37	4·29	6·26	3·25
5. HA local	Kleinman (8)	Ashcroft and Shaw (6)	6·13	4·11	6·01	3·20
6. HA local A_l adjusted	Shaw (7)	Ashcroft and Shaw (6)	6·09	3·67	6·13	2·89
7. Shaw non-local	Shaw (7)	Ashcroft and Shaw (6)	6·32	4·00	6·40	2·82

a, Stedman and Nilsson (1966), at 80°K.

Table 3. Al elastic constants (in units of 10^{11} $N\,m^{-2}$) and pressure derivatives

		C_{11}	dC_{11}/dP	C_{44}	dC_{44}/dP	C'	dC'/dP
Experiment[a, b]		1·14	6·9	0·31	2·3	0·26	1·7
Calculations[c]	1.	1·92	8·5	0·57	2·8	0·32	1·6
	2.	1·20	7·3	0·50	3·0	0·36	1·7
	3.	1·02	7·2	0·49	3·0	0·37	1·7
	4.	1·02	7·3	0·47	3·0	0·38	1·8
	5.	0·98	7·3	0·42	3·0	0·39	1·8
	6.	0·86	6·5	0·39	2·5	0·27	1·3
	7.	1·06	—	0·43	—	0·25	—

a, Kamm and Alers (1964), Vallin *et al.* (1964), at 80°K; b, Ho and Ruoff (1969), at 77°K; c, see table 2 for potential, $f(q)$ and β used for each set.