becomes large enough the metal breaks away from the glass or forms voids which can then increase the resistance unpredictably.

On the other hand it is seen that we get quite good agreement with the results of MacLennan, Niven & Wilhelm (1928) on caesium and with limited data of MacDonald *et al.* (1956) on both metals. Both these sets of results were obtained with capillary specimens so that it is not obvious why we should get such good agreement. The clue to this may again be cavitation. MacDonald *et al.* mention that in their caesium specimens cavitation may have occurred even at room

TABLE 5. THE IDEAL RESISTIVITY OF CAESIUM AT ZERO
PRESSURE, ρ_i, AND AT CONSTANT VOLUME, ρ'_i

T (°K)	ρ_i/T^* ($10^{-8}\,\Omega\,\mathrm{cm/deg}$)	ρ'_i/T^* ($10^{-8}\,\Omega\,\mathrm{cm/deg}$)	T (°K)	ρ_i/T^* ($10^{-8}\,\Omega\,\mathrm{cm/deg}$)	ρ'_i/T^* ($10^{-8}\,\Omega\,\mathrm{cm/deg}$)
2	0.08_9	0.90	120	5.72_8	5.28_7
4	0.63_8	0.64	130	5.77_0	5.28_7
6	1.38_0	1.38	140	5.81_1	5.29_0
8	2.24_2	2.24	150	5.85_3	5.29_0
10	2.94_9	2.95	160	5.89_8	5.30_0
12	3.42_2	3.42	170	5.94_8	5.30_8
14	3.75_0	3.75	180	6.00_2	5.31_9
16	3.99_3	3.99	190	6.05_4	5.33_4
18	4.20_8	4.21	200	6.11_0	5.34_7
20	4.41_2	4.39_5	210	6.16_7	—
30	4.93_6	4.88_7	220	6.22_6	—
40	5.16_8	5.07_3	230	6.28_9	—
50	5.31_0	5.16_1	240	6.35_5	—
60	5.40_6	5.20_9	250	6.42_4	—
70	5.47_0	5.22_7	260	6.49_4	—
80	5.53_0	5.24_1	270	6.56_3	—
90	5.58_7	5.25_5	280	6.64_1	—
100	5.63_7	5.26_7	290	6.72_3	—
110	5.68_5	5.28_0			

* The estimated errors, both random and systematic, are similar to those for rubidium except that oxidation effects begin at *ca.* 180 °K and may be rather larger by room temperature.

temperature (presumably during the solidification process after filling the capillary with liquid metal). Moreover, their rubidium and potassium specimens gave quite inaccurate values for absolute resistivity and this again suggests that cavitation may have occurred. If this is so, then the metal in their specimens may not have completely filled the cross-section of their glass capillaries and this might prevent the building up of any appreciable negative pressure. This question is of some interest because in recent work on the Fermi surfaces of the alkali metals there has been considerable uncertainty about the actual lattice parameter of the specimens in the helium range of temperatures. The metals have been either coated with petroleum jelly (Shoenberg & Stiles 1964) or held in glass capillaries (Okumura & Templeton 1962, 1963) and this introduces uncertainties about the degree of constraint in the specimens. The resistivity data seem to indicate that in the lighter alkali metals (which do not contract so much on cooling) cavitation is probably unusual but much commoner in rubidium and caesium

We next wish to derive values of the resistivity as a function of temperature at *constant density*. For this we have to use the results of our measurements of resistance under pressure (see following section). Consider first the resistivity at

TABLE 6. P-V-T VALUES ASSUMED FOR RUBIDIUM AND CAESIUM*

T (°K)	$V(T)/V(0)$	$-\dfrac{1}{V}\left(\dfrac{\partial V}{\partial p}\right)_T$ $(10^{-5}\,\text{atm}^{-1})$ at $p = 0$	$\dfrac{1}{V}\left(\dfrac{\partial V}{\partial p}\right)_T$ $(10^{-5}\,\text{atm}^{-1})$ at $V = V_0$
		(a) rubidium	
0	1·000	3·56	3·56
30	1·003	3·61	3·56
60	1·009	3·77	3·56
90	1·016	3·94	3·56
120	1·023	4·12	3·56
150	1·030	4·29	3·56
180	1·037	4·47	3·56
210	1·044	4·64	3·56
240	1·052	4·81	3·56
270	1·059	4·99	3·56
300	1·066	5·16	3·56
		(b) caesium	
0	1·000	4·40	4·40
30	1·003	4·46	4·40
60	1·013	4·75	4·40
90	1·023	5·13	4·40
120	1·033	5·40	4·40
150	1·042	5·72	4·40
180	1·052	6·05	4·40
210	1·062	6·38	4·40
240	1·072	6·71	4·40
270	1·082	7·03	4·40
300	1·092	7·36	4·40

* For full references to the sources of experimental data, see Martin (1965).

TABLE 7. A COMPARISON OF RESULTS FOR THE IDEAL
RESISTIVITY OF RUBIDIUM AT ZERO PRESSURE

$\rho_i(T)/\rho_i(273\cdot15)$

T (°K)	1	2	3	4
273·15	1·000$_0$	1·000$_0$	1·000	1·000
87·8$_1$	—	0·277$_2$	—	0·268
77·6$_0$	—	0·241$_7$	—	0·233
20·4$_2$	0·43$_8$	0·045$_9$	0·038	0·040$_3$
14·0$_0$	0·021$_9$	—	—	0·019$_5$
4·20	$\begin{cases} 0\cdot001_3 \\ 0\cdot000_8 \end{cases}$	0·001$_7$	0·0007	0·000$_6$

1, Justi (1948); 2, Meissner & Voigt (1930); 3, MacDonald *et al.* (1956); 4, This work.

a fixed density corresponding to that of the solid at the absolute zero under zero pressure. To obtain these values of ρ_i at any temperature we have worked out from thermal expansion and compressibility data (see table 6) the pressure (p') required at any temperature to compress the metal to the given density. The change in