departures from Matthiessen's rule since purer samples give lower values of $\rho_i$ at low temperatures (this can in fact also be seen in the results of both MacDonald *et al.* (1956) and Rosenberg (1956)).

TABLE 10. THE IDEAL RESISTIVITY OF B.C.C. LITHIUM AT ZERO PRESSURE, $\rho_i$, AND AT CONSTANT DENSITY, $\rho_i'$

| $T$ (°K) | $\rho_i/T^*$ $(10^{-8}\ \Omega\ \mathrm{cm\ deg\,K^{-1}})$ | $\rho_i'/T^*$ $(10^{-8}\ \Omega\ \mathrm{cm\ deg\,K^{-1}})$ |
|---|---|---|
| 80 | 1·244 | $1·24_1$ |
| 100 | 1·714 | $1·71_0$ |
| 120 | 2·081 | $2·07_5$ |
| 140 | 2·359 | $2·35_3$ |
| 160 | 2·571 | $2·56_5$ |
| 180 | 2·728 | $2·72_8$ |
| 200 | 2·852 | $2·85_5$ |
| 220 | 2·941 | $2·95_0$ |
| 240 | 3·013 | $3·03_8$ |
| 260 | 3·075 | $3·10_0$ |
| 273·15 | 3·110 | $3·14_5$ |
| 280 | 3·126 | $3·16_5$ |
| 290 | 3·150 | $3·19_2$ |

* The random error in these results is about $\pm 0·001$ at all temperatures.

### 3·3·2. *The dependence of resistance on pressure*

Because the effect of pressure on the electrical resistance of lithium is generally small, most of our experimental runs were made using liquid baths with the vacuum space around the high-pressure bomb flooded with exchange gas. This limited the pressure runs to comparatively few temperatures.

The density of lithium at a given temperature is almost linearly dependent on pressure so that we would expect the resistance of lithium also to depend nearly linearly on pressure. Indeed at 0 °C, this is what we find. Below this temperature, however, the behaviour of the electrical resistance of lithium under compression becomes quite erratic. We found hysteresis, zero shifts, marked curvature of the resistance–pressure curves and, in some cases, time effects; we emphasize that this is most unlikely to be due to any non-uniformity in the way the pressure is applied. Below about 100 °K these effects could be due to the martensitic transformation but we have also observed these effects at 200 °K in specimens which had never been cooled below that temperature and which we can hardly suppose to be affected by the phase transformation. Because of these irregularities we give in table 11 only the average initial pressure coefficients of the b.c.c. phase of our lithium samples, i.e. the coefficients for temperatures above 75 °K. We have also measured the change of resistivity of lithium six with pressure. This was similar to that of lithium of natural isotopic composition and, in particular, the values for the two materials were identical at 0 °C, within our experimental error.