the behaviour of insulators when shocked. David and Hamann (1960) have shown that the resistivities of water and some insulating liquids fall rapidly with increasing shock pressure.

The resistivity of several insulating materials was measured under shock compression. Of these, epoxy resins showed the best performance; for example the resistivity at 250 kb was found to be not less than 1500 ohm cm for a duration of about 1 μsec after the shock front had passed. The Hugoniot for epoxy resin was calculated from velocity measurements so that the relationship between pressure and shock velocity could be found.

In order to estimate the effect of conduction in the insulator on the resistance of the pressure transducer, some measurements were made using an electrolytic tank analogue. The data obtained, together with the shock resistivity results, showed that a 3 ohm manganin wire in epoxy resin with the geometry employed can be used up to 300 kb without appreciable shunting due to the insulator.

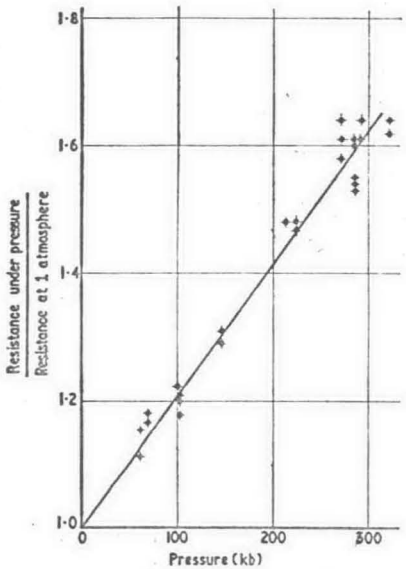

Figure 2. Dynamic resistance–pressure calibration of the manganin wire transducer.

2.3. *Calibration*

The final form of the transducer consisted of a 0·0046 cm diameter manganin wire of 3 ohm resistance soldered between the ends of two parallel 0·132 cm diameter brass tubes mounted 1·43 cm apart in epoxy resin. A series of experiments was carried out in which the resin transmitted shock pressures ranging from 0 to 300 kb. In each experiment the shock velocity in the resin, measured by concentric shock-actuated switch pins, gave the shock pressure using the known Hugoniot curve. Some of the points previously published (Fuller and Price 1962) have been revised, and new points have been added. The results are shown in figure 2. It will be seen that Bridgman's linear result to 30 kb has been extended to 300 kb. The pressure coefficient of resistance is $+0{\cdot}002\,10$ per kb, with a standard deviation of $0{\cdot}000\,03$, for manganin of composition 86% copper, 12% manganese and 2% nickel. This was obtained by linear least squares fit, minimizing errors in resistance and constraining the line to pass through the point ($P = 1$ atm, $R/R_0 = 1{\cdot}000$).

3. Applications

3.1. *Pressure profiles*

The transducer has proved capable of giving reproducible pressure–time profiles of a