Resistance in tension and under hydrostatic compression needed for the analysis are known for silver (Bridgman, 1925). For a 1 kbar HEL in silver and considering the pressure range of these experiments, the effect was found to be unimportant, since at the HEL $\frac{\Delta R}{R_o}$ = -0.002 for uniaxial compression.

7. Resistivity-Pressure Data of Bridgman

Bridgman's measurements (1938) of silver resistivity versus hydrostatic pressure to 30 kbar at 30°C in isopentane are used for comparison to calculated and experimental silver resistivity in the present work. Bridgman's pressures were measured by a manganin coil, using the freezing point of mercury as a calibration point. A review of pressure calibration by Decker et al. (1972) states that Bridgman's scale was about 1% low. Accordingly, Bridgman's pressure values were corrected for use in the present study by multiplying by 1.0103; corrected pressures are believed accurate to 1/4% at 25 kbar according to the reviewers. Bridgman's work was done with only two electrical leads, but because of the high resistance of the silver coil (24 ohms) contact resistance should not have been a problem. In 1952 he measured the silver resistance between opposed anvils to 100 kbar, where the foil was embedded in silver chloride. This anvil work is not used because observed resistance changes cannot be reliably attributed to hydrostatic pressure effect due to plastic deformation and pressure-gradient effects. For the record, at 50 kbar, Bridgman's anvil results give ρ/ρ_o = 0.827

and 0.847 using revised pressure scales suggested by Bundy (1973) and Jura (1973), respectively. In comparison, isothermal hydrostatic resistivity calculated from Eq. (4) is 0.832 at 50 kbar.

B. Equation of State

An equation of state (a P-V-T relation) for silver is needed to calculate shock temperatures and the temperature coefficient of resistivity in the compressed state. Correcting resistivity-shock pressure data to isothermal conditions requires both shock temperatures and temperature coefficients. Temperature coefficients are also used in the model calculation of the resistivity of silver under pressure (Sec. III.A.4).

The equation of state chosen was an analytic fit by Zharkov and Kalinen (1971) to static and dynamic P-V data. Their approach, the method of potentials, involves writing down inter-ionic potentials which depend on distance between charged particles in ways appropriate to the main interactions in the solid. The undetermined coefficients are then found by empirical fit. The method of potentials includes the following advantages:

1. an equation of state in analytic rather than tabular form;

2. more accuracy when extrapolating V or T and when differentiating the equation of state than if an arbitrary polynomial, for example, is fitted to experimental data.

It should be noted that the second statement is valid only if the potential is selected properly (Zharkov and Kalinen, 1971).