In correcting shock resistance to isothermal conditions the temperature coefficient of resistivity at a given volume (Eq. (3)) must also be calculated. This calculation also is used to extrapolate the hydrostatic pressure-resistivity data beyond 30 kbar (Eq. (4)). There are experimental data on the temperature coefficient of ressistivity as a function of pressure for iron (Clougherty and Kaufman, 1963). Calculated approximate coefficients,

$$\frac{\alpha}{\alpha_o} \approx \left(\frac{\theta}{\theta_o}\right)^{-2} \approx \exp\left[2\,\gamma_o\left(\frac{V}{V_o} - 1\right)\right],$$

(here we assumed γ/V = constant) are 0.4% higher at 50 kbar and 2.9% higher at 100 kbar than experimental results. (The iron data extend over a temperature range of 1000°C.) Bridgman has also measured temperature coefficients of resistance as a function of pressure, but there are contradictions in his work. In one set of experiments he measured resistance as a function of temperature at constant pressure and in a second set made measurements as a function of pressure at constant temperature. In the first set he measured resistance changes in noble metals over a 100°C temperature range at constant pressure of 0 to 12 kbar (Bridgman, 1958). The measured temperature coefficient of resistance is independent of pressure to within 1/4% (α/α_o = 1.00). Assuming $\rho = \alpha(V)T$, this work is inconsistent with Bridgman's other work on pressure dependence of resistance at constant temperature (30°C) where $\rho/\rho_o = 0.956$ at 12 kbar (Bridgman, 1938). That is to say, in the first work he found $\alpha/\alpha_o = 1.00$ at 12 kbar, in the latter work $\alpha/\alpha_o = 0.956$. (From

Eq. (3), $\alpha/\alpha_o = 0.96$.) This inconsistency remains if one uses Eq. (4) for relating ρ/ρ_o and α/α_o. Based on the above discussions, accuracy of the calculated volume dependence of resistivity for silver is not well known but may be about 3% over the pressure range studied.

C. Voltage-Time Profiles

Voltage-time profiles for all impact-experiments are presented in Appendix A. Examples of oscilloscope records of the profiles are shown in Fig. 9.

The foils remain under uniaxial compression for 0.5 μsec before a rarefaction wave from the rear sapphire-epoxy interface (Fig. 1) arrives at the foil. Within another 0.5 μsec rarefactions from the sapphire lateral edges also arrive.) The shock-induced signal risetime is about 0.035 μsec. During the next 0.5 μsec the voltage level shows time-dependent structure. Structure depends on pressure level, silver purity, and state of anneal. That the structure is not random noise can be seen by comparing the profiles of shots 73-026 and 73-044 (Fig. A.1 (c) and (d)). The two shots had the same pressure level and were the same foil type. Overall shape and bumps on the profiles do roughly match.

Observed signal risetimes range from 19 to 85 nsec, 35 nsec being typical. Aside from the time it takes for foil resistance to change in response to the shock transition, there are a number of experimental conditions which also affect risetime. These conditions include shock impedance mismatch between