Hugoniot, yielding the expression

$$B = \frac{P_H \alpha_H}{2} - \frac{A}{k} e^{k\alpha_H} - \frac{C^2}{(V_0 - M\alpha_H)} \sum_{i=0}^{\infty} a_i \alpha_H^i \tag{64}$$

where A is given by Eq. (44). The energy E_i can now be determined by setting $\alpha = 0$ and $E_i = E_S$ in Eq. (62) yielding

$$E_i = (A/k) + B. \tag{65}$$

Substituting this value into Eq. (60) produces a value for T_i required in Eq. (59).

The bulk sound speed C_b of the compressed material behind the shock front can be calculated from the expression

$$C_b = -V\sqrt{(\partial P/\partial V)_S} = (V_0 - \alpha)\sqrt{(\partial P/\partial \alpha)_S} \tag{66}$$

where the term $(\partial P/\partial \alpha)_S$ is expressed by Eq. (38). Therefore, the sound speed C_H on the Hugoniot becomes upon substitution of $P_S = P_H$ and $\alpha = \alpha_H$

$$C_H^2 = (V_0 - \alpha_H)^2 \left[kP_H + \frac{C^2(V_0 + M\alpha_H - kV_0\alpha_H)}{(V_0 - M\alpha_H)^3} \right] . \tag{67}$$

In deriving the equations from which isentropes, isotherms, and sound speed are calculated, it is assumed that Γ/V is a constant in the Mie-Gruneisen form for the equation of state. Also, the final expressions obtained for these equations used the experimental fact that U_s and U_p can be described by a linear relation. The determination of the temperature on the Hugoniot has the added assumption that the specific heat C_V is constant for all T which is probably a rather poor assumption. The experimental data for specific heat are usually tabulated as a function of temperature over some temperature range. This C_P data may be converted to C_V by means of Nernst-