Hugoniot, yielding the expression

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

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

$$E_{i} = (A/k) + B.$$
 (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

$$C_{b} = -V_{A}(\partial P/\partial V)_{S} = (V_{0}-\alpha)_{A}(\partial P/\partial \alpha)_{S}$$
(66)

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

$$C_{\rm H}^{2} = (V_{0} - a_{\rm H})^{2} \left[ k P_{\rm H} + \frac{C^{2} (V_{0} + M a_{\rm H} - k V_{0} a_{\rm H})}{(V_{0} - M a_{\rm H})^{3}} \right] .$$
 (67)

In deriving the equations from which isentropes, isotherms, and sound speed are calculated, it is assumed that  $\Gamma/V$  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-