with the value calculated from the thermal expansion data of Müller and Rohrer,[10] rather than the value determined from the data of White.[8] The calculated value of $(\partial T_c/\partial P)_{H=0}$ for niobium is about the limit of our experimental sensitivity and is, therefore, not inconsistent with the zero pressure dependence observed. The experimental results of Hinrich and Swenson[9] are also in good agreement with the calculated value.

The effect of applying pressure to a superconductor, until recently, had always been associated with an observed decrease in the superconducting transition temperature.[11] However, a number of superconductors (Zr,[12] La,[13] U[14] and V[15]) have now been found to exhibit a positive $\partial T_c/\partial P$. We may attempt to understand this difference in sign of the pressure dependence of the superconducting transition temperature by considering the volume derivative of the BCS[16] relationship,

$$T_c = 0.85\ \Theta_D \exp(-\ 1/A) \qquad (5)$$

with A = N(0)V, where N(0) is the density of electron states at the Fermi surface and V is the attractive electron-electron interaction parameter. Differentiation of (5) with respect to volume gives,

$$\frac{\partial \ln\ T_c}{\partial \ln\ v} = \varphi\ \ln\left(\frac{0.85\ \Theta_D}{T_c}\right) - \gamma_G \qquad (6)$$

where $\varphi = \partial\ln A/\partial\ln v$ and γ_G, the Grüneisen constant, represents the volume dependence of the phonon spectrum. Rewriting $\partial\ln T_c/\partial\ln v$ in terms of $\partial T_c/\partial P$ we have,

$$\frac{\partial T_c}{\partial P} = -|K|T_c\left\{\varphi\ln\left(\frac{0.85\ \Theta_D}{T_c}\right) - \gamma_G\right\} \qquad (7)$$

where K is the compressibility.