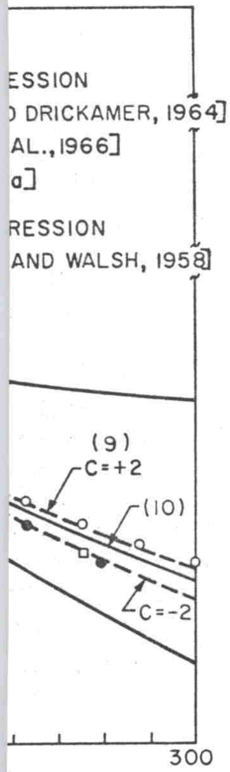

a quadratic approximation to t
given by

$$= 1 + K_0'P + \tfrac{1}{2}CP^2$$

tion formula predicted by t
oximation is obtained in a m
that given in Appendix B
at is

$$\int \frac{dP}{\tfrac{1}{2}CP^2 + K_0'P + 1}\Big]$$

$$\frac{K_0' + (r)^{1/2}][K_0' - (r)^{1/2}]}{K_0' - (r)^{1/2}][K_0' + (r)^{1/2}]}\Big\}$$

$(K_0')^2 - 2C > 0$. For $r = 0$
ume equation becomes

$$\left(\frac{2}{CP + K_0'} - \frac{2}{K_0'}\right)$$

$$\exp\left\{\frac{2}{(-r)^{1/2}}\left[\tan^{-1}\frac{K_0'}{(-r)^{1/2}} - \tan^{-1}\frac{CP + K_0'}{(-r)^{1/2}}\right]\right\} \qquad (11b)$$

pectively. We note from the figure that both ations predict similar values of compression er a considerable pressure range. For negative values of C, equation 11 exhibits an inflection point, corresponding to the maximum lue of K at the positive pressure $P = -K_0'/C$, d at another finite positive pressure

$$P = -\left[\frac{K_0' + (r)^{1/2}}{C}\right]$$

e bulk modulus and volume are both zero. In dition, for positive values of C, equations 11, a, and 11b tend to the limits

$$\left[\frac{K_0' - (r)^{1/2}}{K_0' + (r)^{1/2}}\right]^{1/(r)^{1/2}}, \quad \exp\left[-\frac{2}{K_0'}\right],$$

and

$$\exp\left[\frac{2}{(-r)^{1/2}}\tan^{-1}\frac{K_0'}{(-r)^{1/2}} - \frac{\pi}{(-r)^{1/2}}\right]$$

respectively, as $P \to \infty$. Nevertheless, these equations usually predict reasonable behavior beyond the range of experimental data. The behavior predicted by this quadratic approximation to the bulk modulus has been discussed also by *Macdonald* [1969] in a recent review paper on equations of state.

Appendix A. Some Other Possibilities

There are many expressions that may be suitable for representing the bulk modulus as a function of pressure. To put equation 2 in a more general setting, we write

$$\frac{d(K/K_0)}{dP} = m + \frac{a_1}{P + a} + \frac{a_2}{(P + a)^2} \qquad (A1)$$

When one solves for a_1 and a_2 in terms of K_0', C, m, and a, the results are

$$a_1 = a^2C + 2a(K_0' - m) \qquad (A2)$$

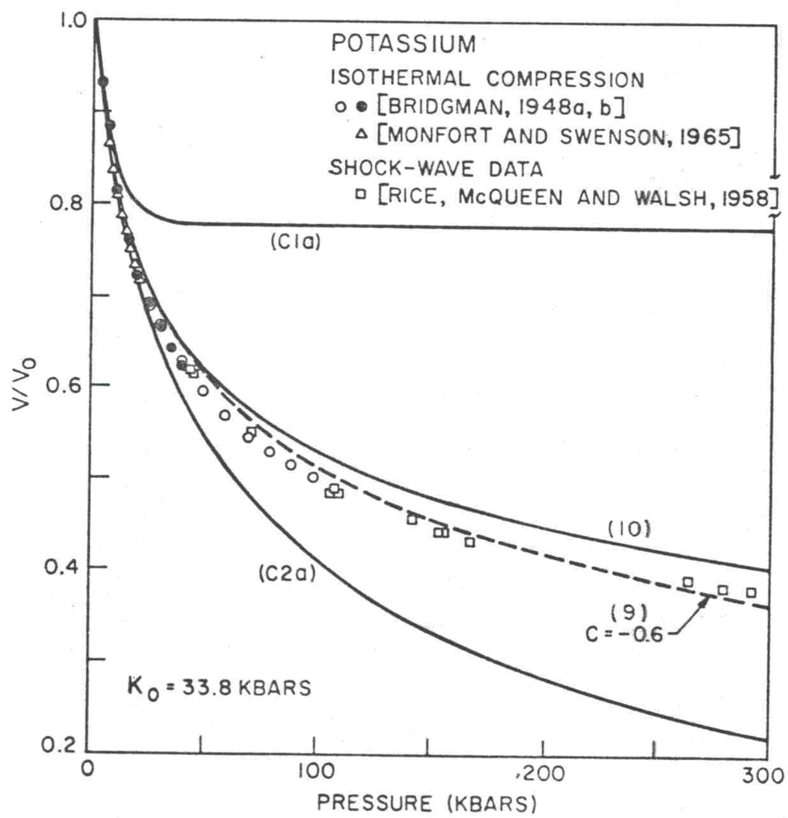

Fig. 5.