- Beattie-Bridgeman equation of state
$$P = \frac{RT}{V_m^2}\left(1 - \frac{c}{V_m T^3}\right)(V_m + B) - \frac{A}{V_m^2} \text{ with}$$
$$A = A_0\left(1 - \frac{a}{V_m}\right) \text{ and } B = B_0\left(1 - \frac{b}{V_m}\right)$$
- Virial equation of state
$$P = RT\left[\frac{1}{V_m} + \frac{B(T)}{V_m^2} + \ldots\right]$$
- Maxwell constructions justified on theoretical grounds
van der Waals + Redlich good for reproducing P-V isotherms for real gases only in single-phase gas region $T > T_c$ + for densities well below critical density, $\rho_c = M/V_{mc}$

7.3 The Compression Factor
- used for how large error in P-V curves if ideal gas law is used rather than van der Waals + Redlich
  compression factor, $Z = \frac{V_m}{V_m^{ideal}} = \frac{PV_m}{RT}$
  ~ for ideal gas $z = 1$ for all values of P, V_m
  ~ $Z > 1$ real gas exerts greater pressure than ideal.
  $Z < 1$ real gas exerts smaller pressure than ideal
- Boyle temperature, $T_B = \frac{a}{Rb}$
- Figure 7.6 shows:
  If $\lim_{P \to 0} (\partial Z/\partial P)_T < 0$ for a particular gas, $T < T_B$, attractive part of potential dominates. If $\lim_{P \to 0} (\partial Z/\partial P)_T > 0$ for a gas $T > T_B$ and repulsive part of potential dominates