TABLE 5.2.--Values of $\frac{dN^*}{dG_{21}}$

G_{21} [a] (ergs/atom)	P (Mbar)	n*	$\frac{\Delta W(n^*)}{kT_0}$ [b]	$\exp\left(-\frac{\Delta W(n^*)}{kT_0}\right)$	$\frac{dN^*}{dG_{21}}$ $\frac{\text{number atom}}{\text{ergs cm}^3}$	$\frac{dN^*}{dG_{21}}$ $\frac{\text{number gm}}{\text{Mbar cm}^6}$
A	0.13	51.1	99.8	4.5×10^{-44}	-8.3×10^{-5}	-7.7×10^{-15}
2A	0.144	6.4	14.4	5.6×10^{-7}	-1.3×10^{32}	-1.2×10^{22}
3A	0.158	1.9	4.84	7.9×10^{-3}	-5.4×10^{35}	-5.0×10^{25}
4A	0.172	0.8	2.28	1.0×10^{-1}	-2.9×10^{36}	-2.6×10^{26}

[a] $G_{21_A} = G_{21}(P=.13 \text{ Mbar}, T=338°K) = -8.33 \times 10^{-15}$ ergs/atom $= -7.06 \times 10^{8}$ ergs/cm^3

[b] $\Delta W(n^*) = (6.85 \times 10^{-14} \text{ ergs/atom})\, n^* + (4.62 \times 10^{-14} \text{ ergs/atom})\, n^{*2/3}$

Discussion of points 1 and 2 is deferred to Chapter 6. Concern here is with point 3 and the quasistatic Hugoniot data in the mixed phase region shown in Fig. 4.7.

It can be seen from Fig. 4.7 that changes in V are nearly linearly related to changes in pressure for P between 130 and 200 kbar. If these measured points deviate from equilibrium because transformation stops before completion, then the mass fraction, $f(P,T)$, can be calculated for each point on the Hugoniot above the transition point according to the lever rule,

$$1 - f = \frac{V_2(P,T) - V(P,T)}{V_2(P,T) - V_1(P,T)} , \qquad (5.15)$$

where f is the mass fraction of phase 2, $V(P,T)$ is specific volume of the mixture, and $V_1(P,T)$ and $V_2(P,T)$ are specific volumes of phases 1 and 2, respectively. As V approaches V_2 in value, small systematic uncertainties in V_2-V_1, V_2, and V lead to large uncertainties in $1 - f$:

$$\frac{\delta(1-f)}{1-f} = \frac{\delta V_2}{V_2-V} - \frac{\delta V}{V_2-V} - \frac{\delta(V_2-V_1)}{V_2-V_1} . \qquad (5.16)$$

Values of f calculated from Eq. (5.15) and the measured Hugoniot points shown in Fig. 4.7 are represented in Fig. 5.7, where $\ln(0.93-f)$ is plotted versus $P-P^{TL}$. This odd ordinate was chosen because it was found that subtracting 0.07 from $1 - f$ produced a reasonable fit of the data to a straight line, as shown. This deviation of $1 - f$ from zero at the asymptote may be due to error in estimating the position of the