$$\sigma_f^2 = \frac{[r^{1/2}(1 + r^{1/2})]/T + [1 + r^{1/2}]/T}{R_B(r-1)^2} = \frac{(r^{1/2}+1)^2}{TR_B(r-1)^2} \qquad (11.27)$$

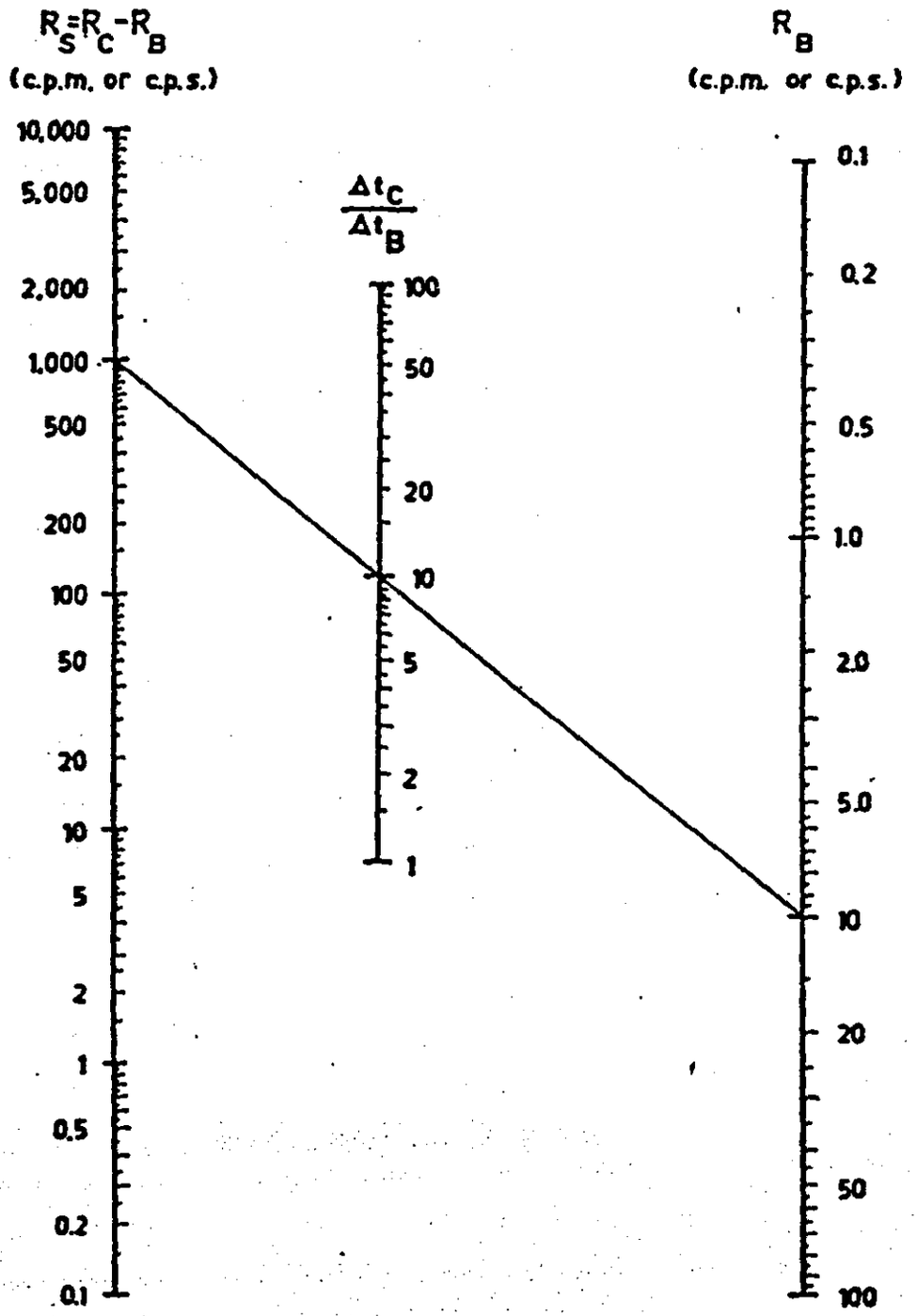

Fig. 11.7. Optimum $\Delta t_c/\Delta t_b$ as a function of background rate R_b and counting rate $R_s = R_c - R_b$ (20).

11.3a

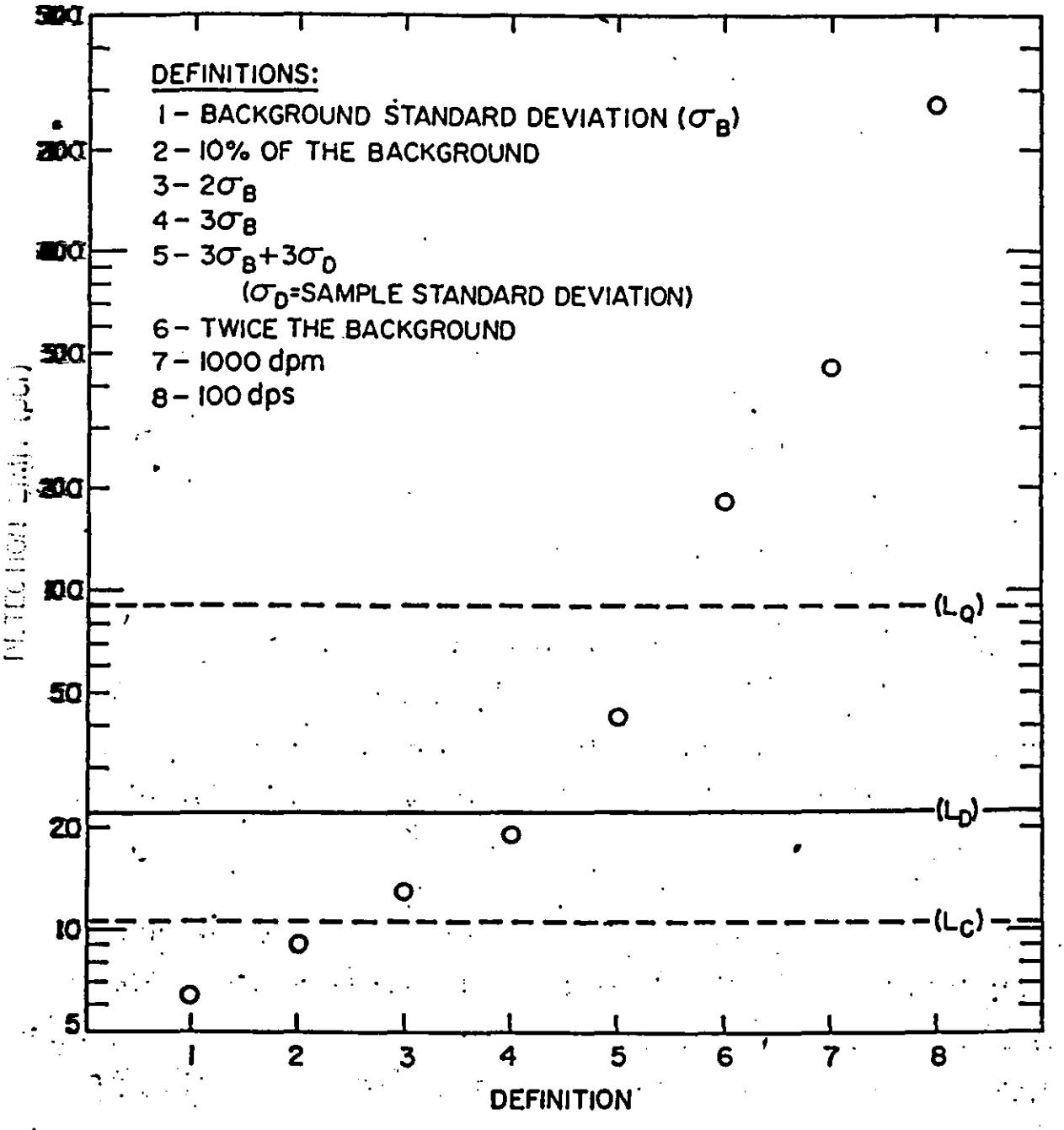

Figure 8.14 A comparison of some commonly used definitions of "detection limit" which shows a range of nearly three orders of magnitude. [From L. A. Currie, Limits for Qualitive Detection and Quantitative Determination; Application to Radiochemistry, *Anal. Chem.* 40, 586–593 (1968).]

SLOWPOKE
DETECTION LIMITS

ng	Elements
0.01 - 0.09	Dy, Mn,In, Eu
0.1 - 0.9	Rh, Lu, V, Cs, Sm, Ir, Au
1 - 9	Sc, Br, Ba, W, Re, Os, U, Na, Al, Cu, Ga, As, Sr, Pd, I, La, Er, Co, Ag, Sb, Ho, Hf, Ar, Ta
10 - 99	Ge, Ru, Cd, Te, Xe, Nd, Yb, Pt, Hg, Mo, Pr, Gd, Cl, Se, Ti, Tb, Th, Kr
100 - 999	Mg, Zn, Sn, Ce, Tm, K, Ni, Rb, Cr, Nb, Y
1000 - 9999	F, Ne, Ca, Zr,
10000-300000	Si, S, Fe, Pb

Note : ti = 1 h, F = 1E+12 n/cm^2/s
\aa\sdl

11.4

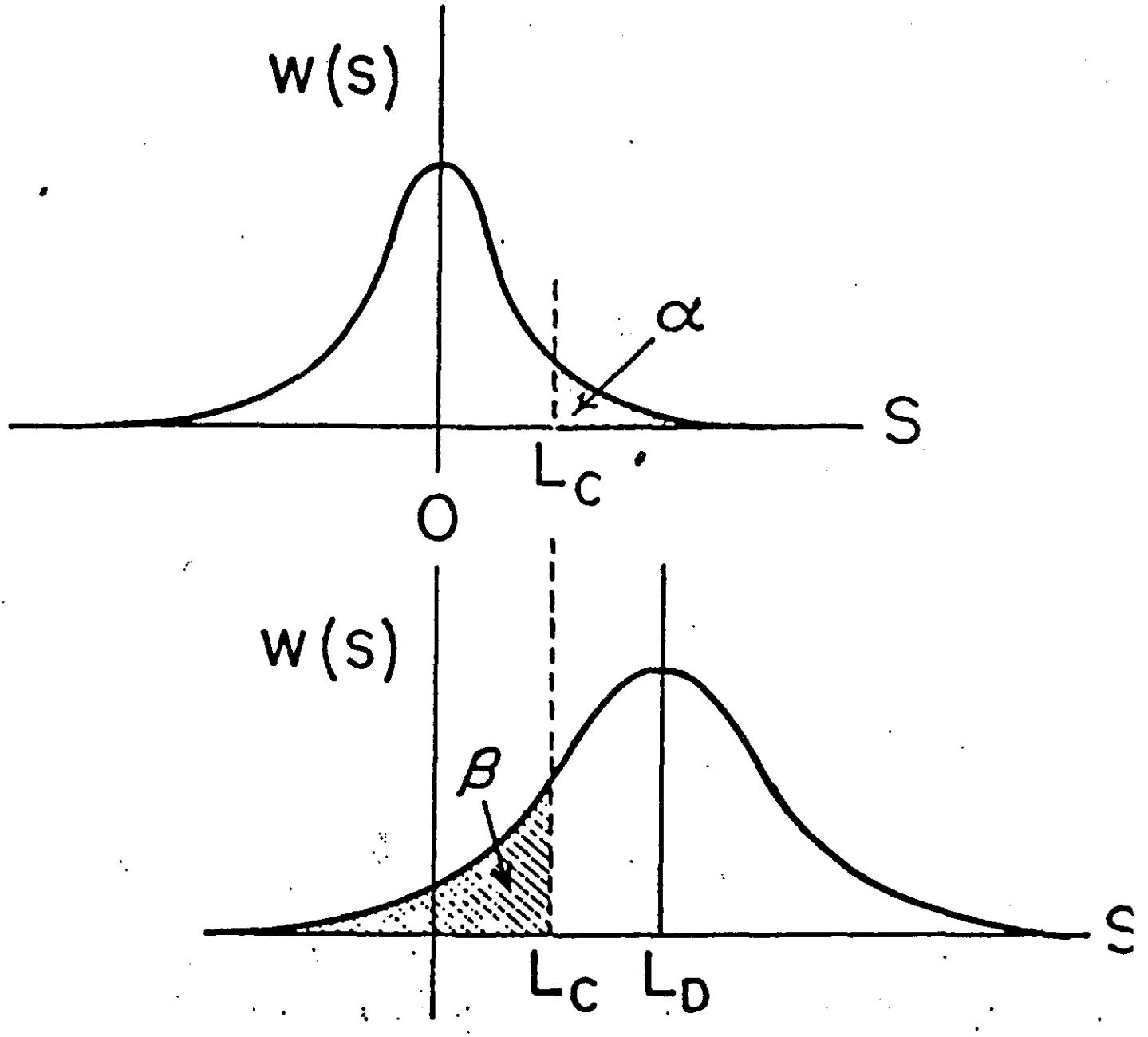

Figure 8.15 The relationships between L_C L_D, and the probability distributions fo $\mu_s = 0$ and $\mu_s = L_D$. [From L. A. Currie Limits for Qualitative Detection and Quan titative Determination; Application t Radiochemistry, *Anal. Chem.* **40**, 586–59

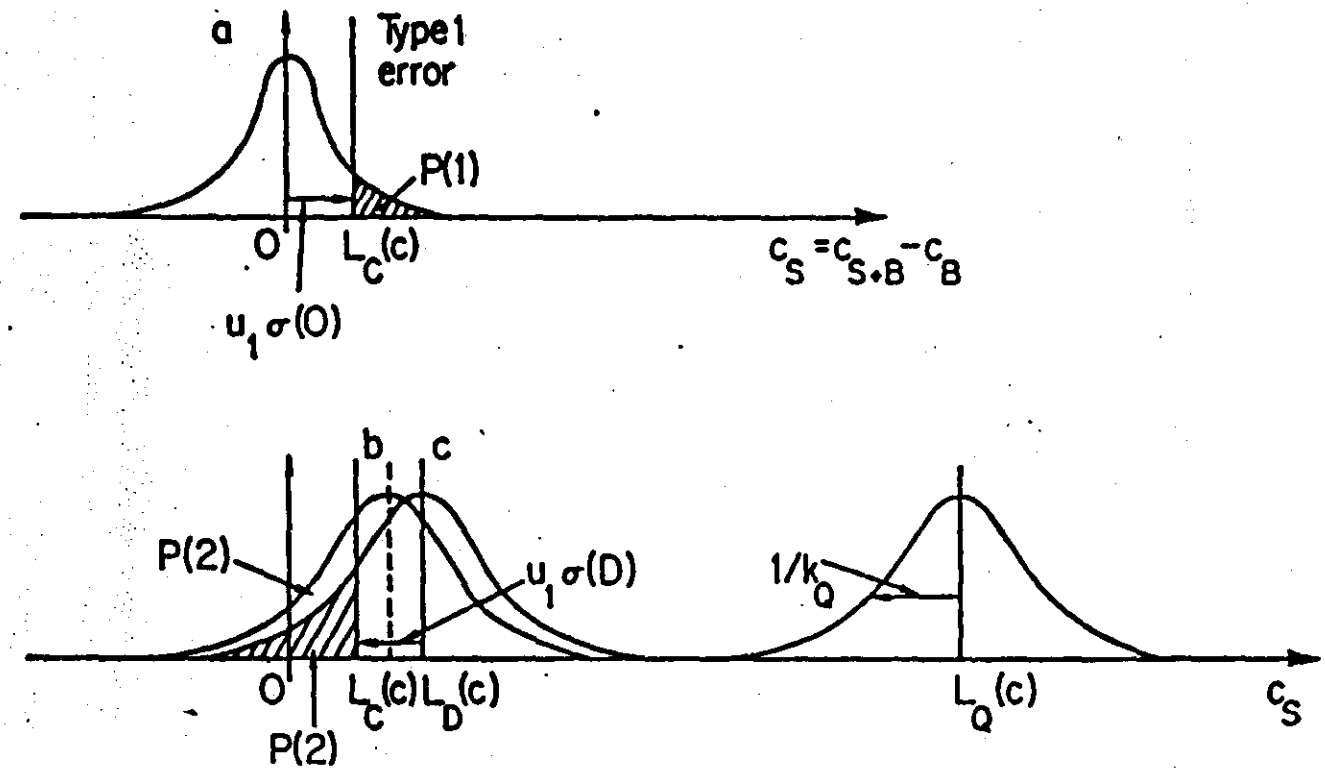

Fig. 11.9. Signal detection. Definition of critical level $L_C(c) = \mu_1\sigma(0)$ detection limit $L_D(c) = L_C(c) + \mu_1\sigma(D)$ and determination limit $L_Q(c) = k_Q\sigma_Q$ (21).