This equation is the same as Eq. 6, for which all of the drug was assumed to be in solution. For the case of $Q >> C_S$, Eq. 9 predicts that β is small. A series expansion of Eq. 9 permits an explicit calculation of erf(β) as follows:

$$\text{erf}(\beta) = \sqrt{\frac{2}{\pi} \frac{C_s}{(Q - C_s)}} \qquad [11]$$

Upon combining this with Eq. 8, the following result is obtained:

$$M_t = \sqrt{2 D C_s (Q - C_s) t} \qquad [12]$$

Equation 12 is identical in form with Eq. 1 except that C_S appears in lieu of $C_S/2$, which is a result of the limit process. Paul and McSpadden point out that no relevant difference exists in the theoretical treatments when $Q >> C_S$. In effect, they conclude that the pseudo-steady-state assumption that resulted in Eq. 1 is adequate when $Q >> C_S$. To test the utility of Eq. 8, Paul and McSpadden (10) performed a series of experiments for which the release rates of an organic dye, diffusing out of a silicone polymer and into an acetone sink, were measured over a wide range of solute loadings ($Q/C_S < 1$ to $Q/C_S > 1$). The theoretical predictions were experimentally borne out over the entire range of solute loadings.

Yet another approach to the problem of drug release from a nonerodible solution-suspension matrix has been developed by Lee (11). This approach involves the application of a refined heat balance integral method to the moving boundary problem first solved by Higuchi and then more rigorously addressed by Paul and McSpadden. As before, Lee assumed that diffusion occurs from a planar surface, and that a sink condition existed at the matrix-receiver interface. The result of Lee's derivation is

$$M_t = \frac{1 + H}{\sqrt{3H}} [C_s \sqrt{D t}] \qquad [13]$$

where H is defined as

$$H = 5\left(\frac{Q}{C_s}\right) - 4 + \sqrt{\left(\frac{Q}{C_s}\right)^2 - 1} \qquad [14]$$

Like the Higuchi treatment, Eq. 13 is an approximate solution to the problem. Lee compared the predictions of Eq. 13 and the Higuchi