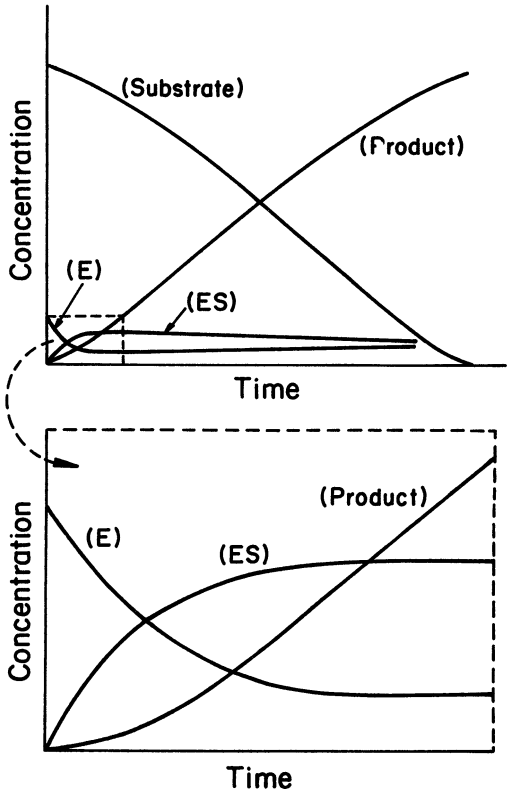

Figure 3.4. Time course of the formation of an enzyme/substrate complex and initiation of the steady state, as derived from computer solutions of data obtained in an actual experiment on a typical enzyme. The portion in the dashed box in the top graph is shown in magnified form on the lower graph. (With permission, adapted from A. Lehninger, *Biochemistry*, 2d ed., Worth Publishers, New York, 1975, p. 191.)

Solving eq. 3.10 for [ES],

$$[\mathrm{ES}] = \frac{[\mathrm{E}_0][\mathrm{S}]}{\dfrac{k_{-1} + k_2}{k_1} + [\mathrm{S}]} \tag{3.11}$$

Substituting eq. 3.11 into eq. 3.2 yields

$$v = \frac{d[\mathrm{P}]}{dt} = \frac{k_2[\mathrm{E}_0][\mathrm{S}]}{\dfrac{k_{-1} + k_2}{k_1} + [\mathrm{S}]} \tag{3.12a}$$

$$v = \frac{V_m[\mathrm{S}]}{K_m + [\mathrm{S}]} \tag{3.12b}$$

where K_m is $(k_{-1} + k_2)/k_1$ and V_m is $k_2[\mathrm{E}_0]$. Under most circumstances (simple experiments), it is impossible to determine whether K_m or K_m' is more suitable. Since K_m results from the more general derivation, we will use it in the rest of our discussions.