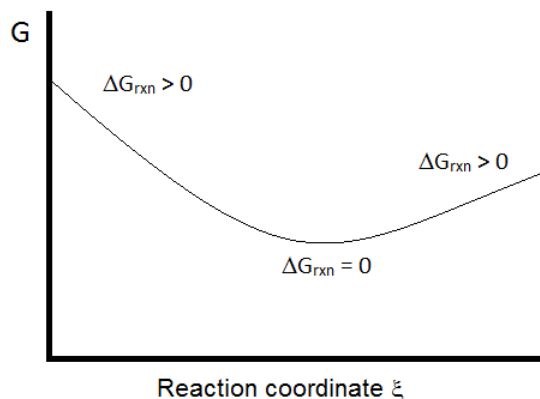


9.1: Prelude to Chemical Equilibria

The small is great, the great is small; all is in equilibrium in necessity... - Victor Hugo in "Les Miserables"

As was discussed in Chapter 6, the natural tendency of chemical systems is to seek a state of minimum Gibbs function. Once the minimum is achieved, movement in any chemical direction will not be spontaneous. It is at this point that the system achieves a state of equilibrium.



From the diagram above, it should be clear that the direction of spontaneous change is determined by minimizing

$$\left(\frac{\partial G}{\partial \xi} \right)_{p,T}.$$

If the slope of the curve is negative, the reaction will favor a shift toward products. And if it is positive, the reaction will favor a shift toward reactants. This is a non-trivial point, as it underscores the importance of the composition of the reaction mixture in the determination of the direction of the reaction.

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