This section to be added where indicated on pg 251.

Within the remainder of this chapter and the next chapters, methods will be developed to determine $\hat{f}_i$ from experimental data, and methods will be developed to predict and/or correlate the component fugacity values. Suppose that experiments have been conducted in a binary system that have led to the values of $\hat{f}_1$ in Fig 0.1 plotted as points and connected with the smooth curve. The fugacity of component 1 follows Henry's law at low concentrations, and follows the Lewis/Randall rule at high concentrations. The behavior of the component 2 fugacity is not plotted, but it will be a *qualitative* mirror image of the behavior of the plotted component 1 fugacity. The component 2 fugacity will approach zero as x_2 approaches 0, and the values of the ideal solution lines at $x_2 = 1$ will be h_2 and f_2. The fugacities of both components in this example will lie above their respective Lewis/Randall ideal solution lines, and the mixture is described as having *positive deviations* from the ideal solution. If the fugacity curves of the components lie below the Lewis/Randall lines, the mixture is described as having *negative deviations* from the ideal solution. The convention for characterizing the deviations as positive or negative generally refer to the deviations from the Lewis/Randall rule rather than Henry's law.

If the plotted real solution fugacity represents a vapor phase, it is characterized using Eqn. 9.18 and approaches the value $f_1 = \varphi_1 P$ as y_1 approaches 1. If the plotted real solution fugacity represents a liquid phase, it can be characterized by Eqn. 9.19 or 9.20. For either vapors or liquids, the deviations from the ideal solution behaviors depend on composition, so $\hat{\varphi}_i$ and/or γ_i values depend on composition. Before we handle the general case of treating solutions that deviate from ideal solutions, we will introduce calculations for systems that follow ideal solution behavior.

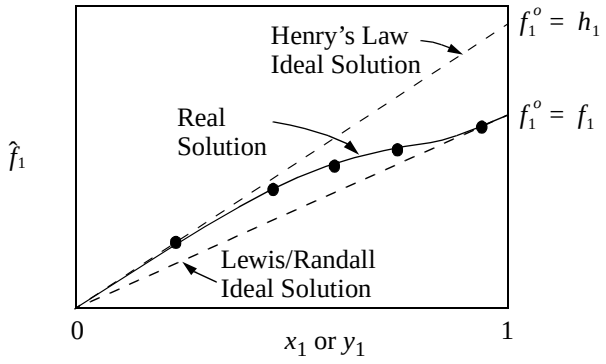

Figure 0.1 Schematic representation of the fugacity of component 1 in a binary mixture.