

Figure 24-3 Gas chromatographic separation of a perfume oil on a 2-mm-diameter \times 1.5-m-long packed column (upper trace) and a 0.25-mm-diameter \times 30-m-long open tubular column (lower trace), both using Carbowax 20 M (Table 24-1) as stationary phase. Taller peaks in both chromatograms are clipped off so that the smaller peaks can be seen. One component eluted near the end of each trace is shaded to emphasize how much sharper the trace from the open tubular column is. [From R. R. Freeman, ed., *High Resolution Gas Chromatography* (Palo Alto, CA: Hewlett Packard Co., 1981).]

from Daniel C. Harris, *Quantitative Chemical Analysis*, **5th ed.**, New York: W. H. Freeman, 1999.
(This figure does not appear in your edition of Harris.)

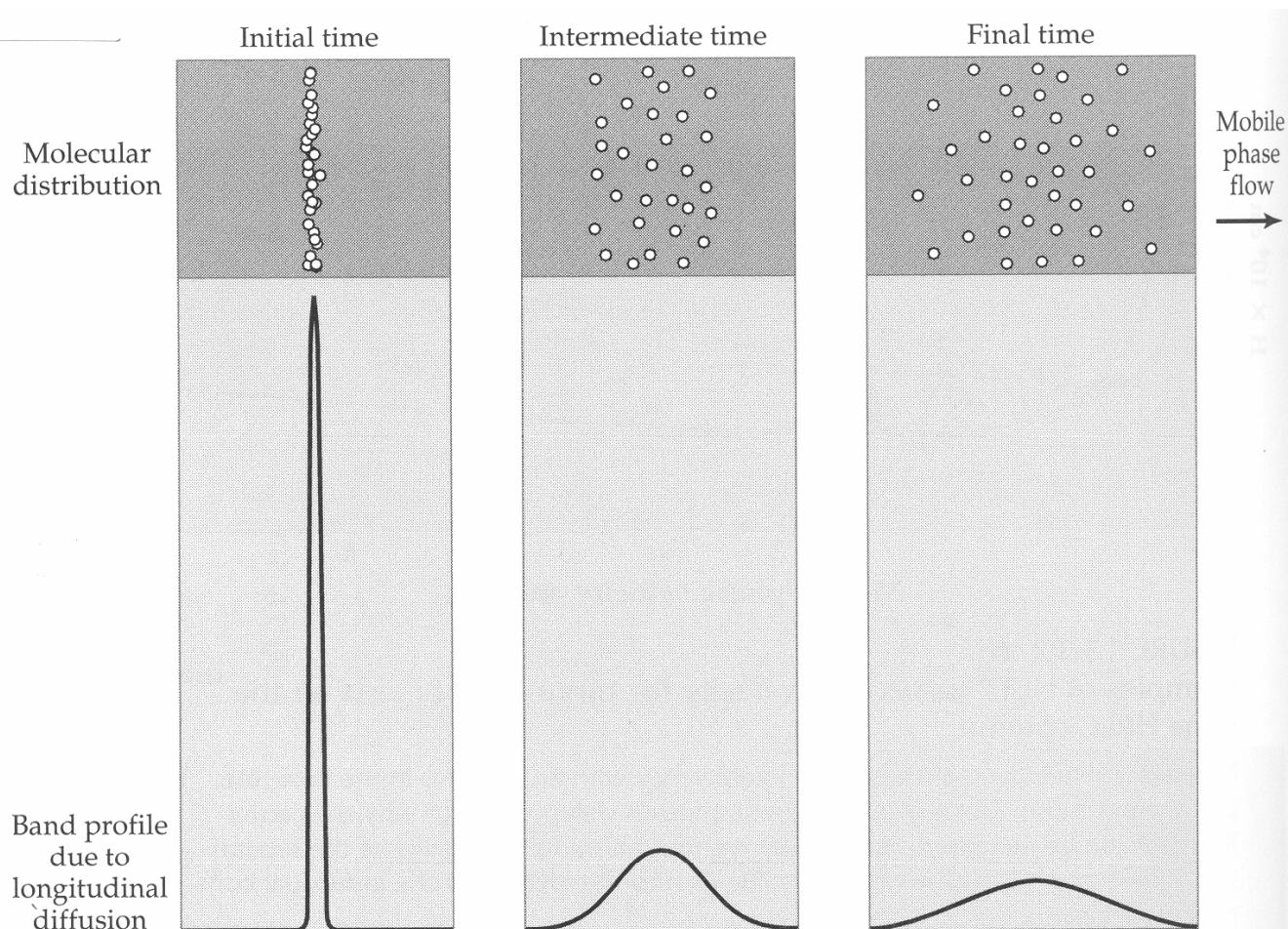


FIGURE 13.13 ▲

Illustration of the mechanism of longitudinal diffusion.

This is the B -term in Equation 13-20.* The molecules of the sample initially are together in a plane. As they pass through the particle bed, the molecules tend to diffuse randomly. The diffusion takes place both along and against the direction of mobile phase flow, as indicated in the figure. The longer time the sample is in the column, the wider will be the distribution of the component molecules. Thus, the contribution to the band's width increases with a slower flow rate. This process contributes little to the width of the bands in liquid chromatography.

*Equation 13-20 is referring to the van Deemter equation.

from Kenneth A. Rubinson and Judith F. Rubinson, *Contemporary Instrumental Analysis*, Upper Saddle River, NJ: Prentice Hall, 2000.