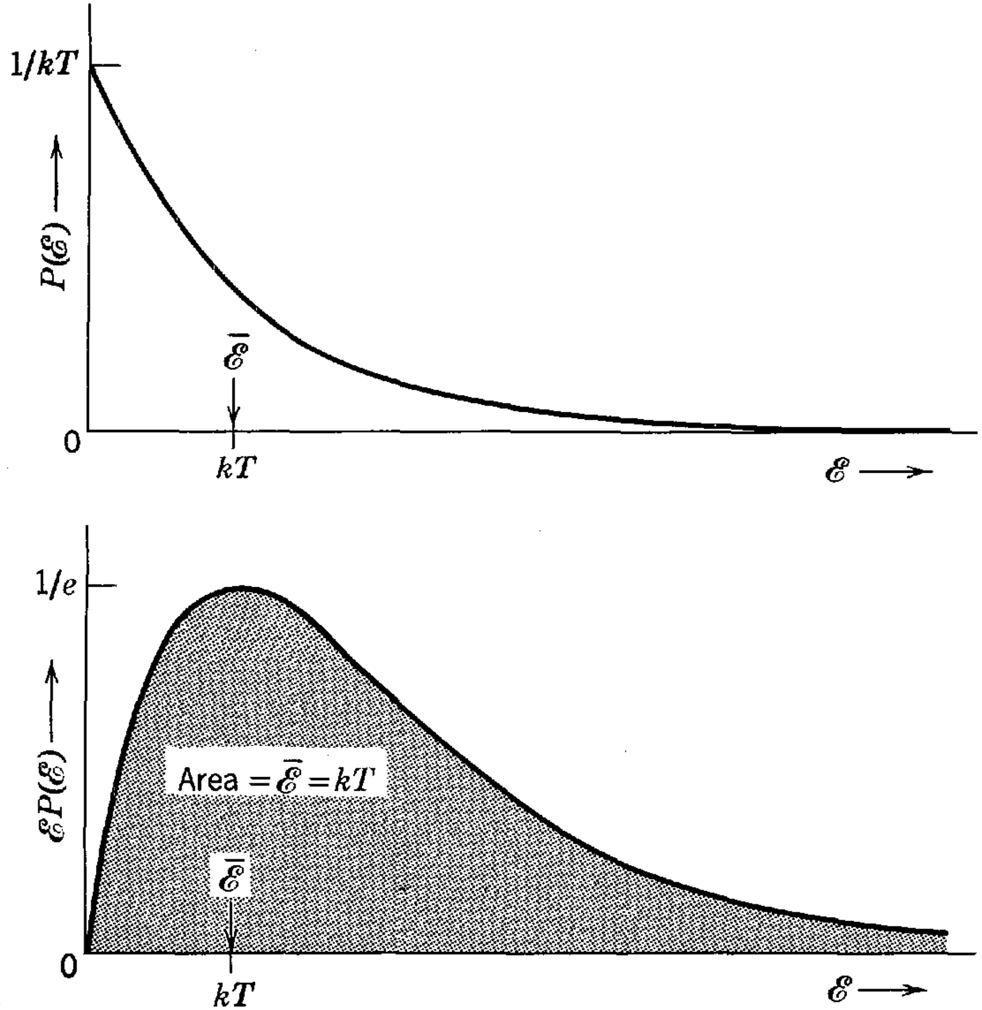

Figure 1-9 *Top:* A plot of the Boltzmann probability distribution $P(\mathscr{E}) = e^{-\mathscr{E}/kT}/kT$. The average value of the energy $\mathscr{E}$ for this distribution is $\overline{\mathscr{E}} = kT$, which is the classical law of equipartition of energy. To calculate this value of $\overline{\mathscr{E}}$, we integrate $\mathscr{E}P(\mathscr{E})$ from zero to infinity. This is just the quantity that is being averaged, $\mathscr{E}$, multiplied by the relative probability $P(\mathscr{E})$ that the value of $\mathscr{E}$ will be found in a measurement of the energy. *Bottom:* A plot of $\mathscr{E}P(\mathscr{E})$. The area under this curve gives the value of $\overline{\mathscr{E}}$.