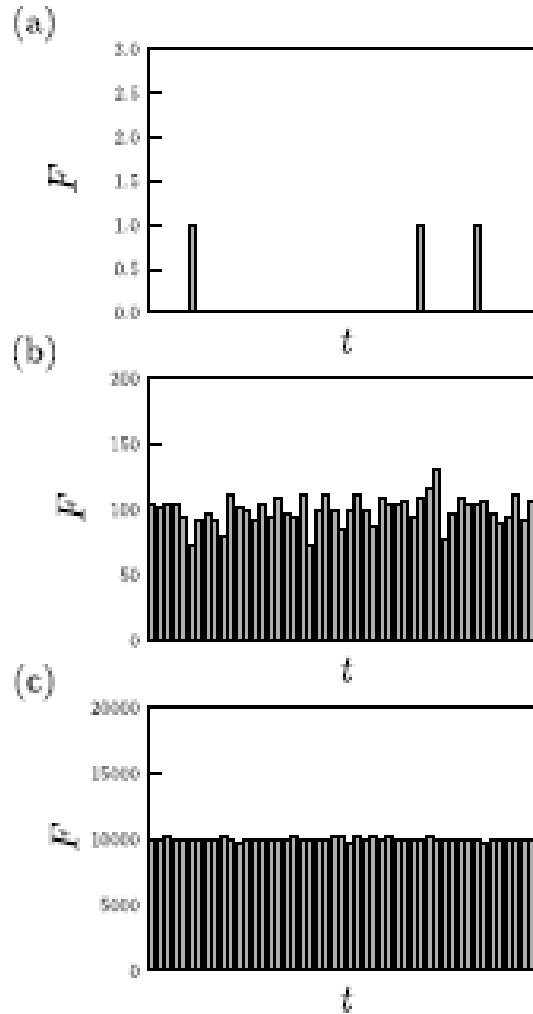


# Fluctuations and the Thermodynamic Limit

Raindrops striking a roof

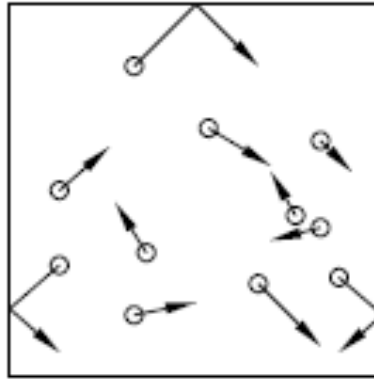


Fluctuations scale like  $1/\sqrt{N}$

As  $N \rightarrow \infty$  the fluctuations become very small

**Fig. 1.1** Graphs of the force on a roof as a function of time due to falling rain drops.

# The Origin of Pressure of a Gas



**Fig. 1.2** In the kinetic theory of gases, a gas is modelled as a number of individual tiny particles which can bounce off the walls of the container, and each other.

Blundell and Blundell, *Concepts in Thermal Physics*, 2<sup>nd</sup> Edition

The number of atoms, and their collisions with the walls of the container, are very large