H.Haken - Synergetics, An Introduction
1. Goal - 2. Probability

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Contents

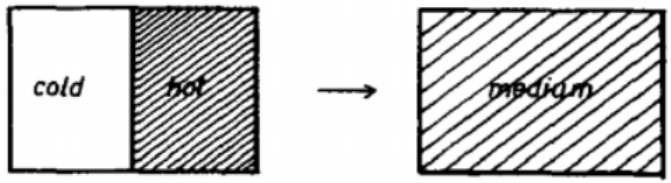

Fig. 1.1. Irreversible heat exchange

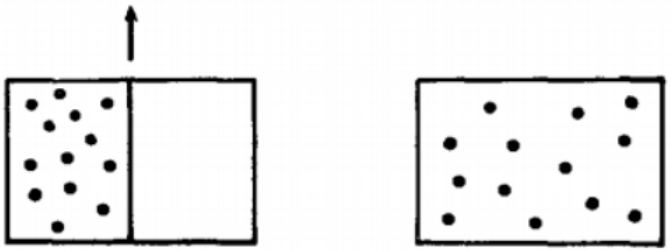

Fig. 1.2. Irreversible expansion of a gas

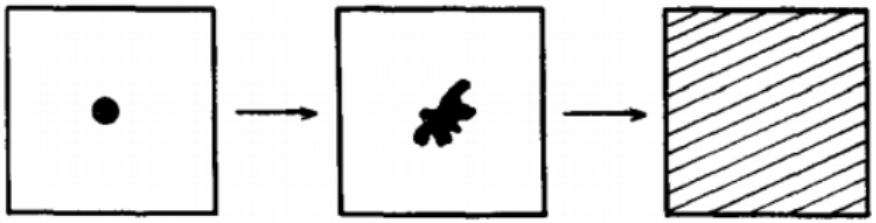

Fig. 1.3. Drop of ink spreading in water

Figure: Irreversible processes: (a) heat exchange, (b) expansion of a gas, (c) Drop of ink spreading in water

In all these cases the systems develop to a unique final state, called a state of **thermal equilibrium**.

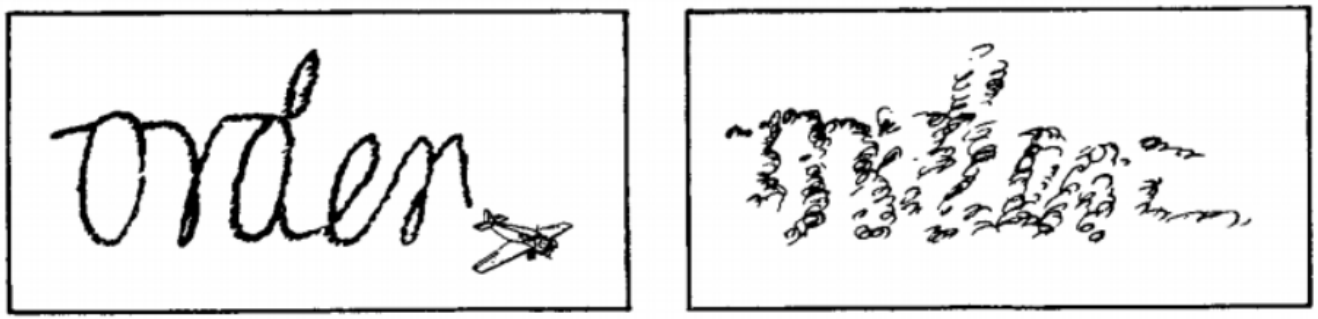

Fig. 1.4. Diffusion of clouds

Figure: Diffusion of clouds

Disorder is increased.

- In the realm of thermodynamics, there exists a quantity called **entropy** which is a measure for the degree of disorder.
- The (phenomenologically derived) laws of thermodynamics state that in a closed system(i.e., a system with no contacts to the outer world) the entropy ever increases to its maximal value.

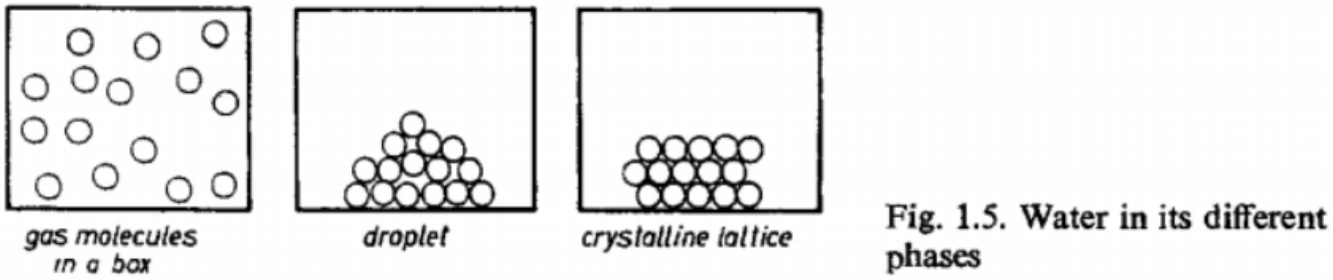

Figure: Water in its different phases

The transitions between the different aggregate states, also called phases, are quite abru