

might be *saturated* ; and that when the water was beyond the amount required for saturation, it appeared in a visible form. The saturating quantity was held to depend mainly on warmth and wind.

This theory was by no means devoid of merit ; for it brought together many of the phenomena, and explained a number of the experiments which Le Roi made. It explained the facts of the transparency of vapor, (for perfect solutions are transparent,) the precipitation of water by cooling, the disappearance of the visible moisture by warming it again, the increased evaporation by rain and wind ; and other observed phenomena. So far, therefore, the introduction of the notion of the chemical solution of water in air was apparently very successful. But its defects are of a very fatal kind ; for it does not at all apply to the facts which take place when air is excluded.

In Sweden, in the mean time,<sup>7</sup> the subject had been pursued in a different, and in a more correct manner. Wallerius Ericson had, by various experiments, established the important fact, that water evaporates in a *vacuum*. His experiments are clear and satisfactory ; and he inferred from them the falsity of the common explanation of evaporation by the solution of water in *air*. His conclusions are drawn in a very intelligent manner. He considers the question whether water can be changed into air, and whether the atmosphere is, in consequence, a mere collection of vapors ; and on good reasons, decides in the negative, and concludes the existence of permanently-elastic air different from vapor. He judges, also, that there are two causes concerned, one acting to produce the first ascent of vapors, the other to support them afterwards. The first, which acts in a vacuum, he conceives to be the mutual repulsion of the particles ; and since this force is independent of the presence of other substances, this seems to be a sound induction. When the vapors have once ascended into the air, it may readily be granted that they are carried higher, and driven from side to side by the currents of the atmosphere. Wallerius conceives that the vapor will rise till it gets into air of the same density as itself, and being then in equilibrium, will drift to and fro.

The two rival theories of evaporation, that of *chemical solution* and that of *independent vapor*, were, in various forms, advocated by the next generation of philosophers. De Saussure may be considered as the leader on one side, and De Luc on the other. The former maintained the solution theory, with some modifications of his own. De

---

<sup>7</sup> Fischer, *Gesch. Phys.* vol. v. p. 63.